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STRATEGY FOR INTERNATIONAL FISHERIES RESEARCH

C/O IDRC, P O Box 8500, Ottawa, Ontario, Canada K1G 3H9
Tel 613-236-6163 Ext 2540, 2566 Fax 613-567-4349, 238-7230



FISHERIES INFORMATION NEEDS IN DEVELOPING COUNTRIES

ISSUES, CONSTRAINTS AND OPPORTUNITIES

**Report Prepared for SIFR
BY
Yong-Ja Cho, SIFR Consultant**

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I EXECUTIVE SUMMARY

I 1 Findings

Management of fisheries sector requires diversified types of information that is closely related to the job function of the users. Users of fisheries information tend to satisfy their information needs first through personal and informal information channels, and then through local or institutional libraries.

Information services at international level are normally provided by international agencies such as United Nations agencies or international research centers. A number of commercial publishers produces information sources such as indexes, abstracts, special bibliographies, and provide source documents delivery services worldwide.

The most relevant and widely-used international fisheries information system is ASFIS (Aquatic Sciences and Fisheries Information System), the international cooperative system coordinated by FAO (Food and Agriculture Organization), and its products ASFA.

Additionally, there are number of international and regional organizations that facilitate and organize studies, workshops, and conferences, and publish and disseminate findings and outcome of their activities widely. Many publications of these organizations are captured by and included in the above noted international information sources.

There are also number of international and regional institutions that have a strong information program specifically designed to provide services to developing countries. They include FAO, ICLARM, BOBP and SEAFDEC. However, there is no clear evidence that these services are actively and fully utilized by the information users or providers in Southeast Asia.

The fisheries sector does not appear to have a comprehensive international information system that collects, organizes, and provides access to literature of the sector. Reflecting the nature of the sector, fisheries information is scattered by subjects, e.g., biology and life sciences, aquaculture or fish farming, ecology, economic, post harvest processing and handling, marine engineering, etc. Specialization by fields is not necessary negative, provided that users and providers of the information are well aware of uniqueness of various information sources, and have access to them. Unfortunately, the fisheries sector suffers due to lack of awareness of available information sources and services.

The existing international and regional information sources tend to collect and organize research information, thus serving the needs of the research community. Research

information tends to stay within the research community. The users that are not served are those in non-research community, e.g., policy makers, resource base managers, extension specialists, and fishing communities.

The users in non-research community find scientific research information too narrow and specialized. Information is not integrated, synthesized, and digested in the context of local resource management needs. Lack of appropriately packaged information is a serious constraint identified by the information users. Understandably, the users are discouraged by the amount of time and effort required to obtain needed information. Furthermore, the users are frustrated by incomplete, insufficient, fragmented and inappropriate information. It has been pointed out that (a) the fundamental problem is appropriateness of information and timeliness of services, not the lack of information, and (b) what is needed is useful information, not a publication or article.

ASFA is an important information source in fisheries sector, and plays an important role in meeting the needs of the research community. However, ASFA does not escape the weakness noted above. In order to be relevant and useful to the needs of developing countries, ASFA needs an improvement in its coverage of developing countries' literature, literature about developing countries, and currency of literature covered. Then, ASFA needs to ensure a wider distribution in developing countries.

The main issues and constraints in effective flow and utilization of fisheries information in Southeast Asian countries are related to accessibility, availability, currency, compatibility, appropriateness, relevancy, suitability, and utility of information, sustainability of services, and qualification of information staff. The value of information seems to be decreased due to lack of compatibility, relevancy and reliability of the information provided. Poor utility of international information sources are mainly due to inappropriate presentation, lack of synthesized and consolidated information relevant to developing countries, and language and professional barriers.

Many libraries and information centers in Southeast Asia struggle to do a good job of collecting and organizing information sources, but are not effective in dissemination and provision of services. On the whole, the fisheries information programs in Southeast Asia are reactive and passive, rather than proactive and initiative. A variety of constraints exists in utilizing international and regional information sources and services. These include a low priority given to information programs, lack of facilities and infrastructure, inadequate funding or support, organizational limitations, delays caused by distance or lack of sensitivity, lack of appropriate information, and language, bureaucratic and professional barriers. There is awareness of international information sources and services, but there is a gap in utilization.

Fisheries information services and systems in Southeast Asia have made a considerable progress in the past decades. However, the regional mechanisms that were developed and established during the donor funded projects SEAFIS and BRAIS, became inactive since

completion of the projects in 1989, and presently, the regional is suffering from complete lack of leadership and coordination. The sector needs to carry out a periodic, systematic analysis of information needs by major job functions of the users, information infrastructure and resources, and develop a strategy for strengthening information resources and services to meet the needs of the sector.

Information needs of today's researchers, managers, and planners can be served only partially by the lists of publications, abstracts, copies of source documents and files of data provided by traditional information services. There is an urgent need for the information programs to give a closer attention to the needs of the users outside the research community. Improved accessibility and availability through effective and efficient sharing of information resources and skills, and filling in the gaps with appropriately digested and integrated information packages are important challenges that must be undertaken.

I 2 Recommended Actions

The recommendations reflect the urgent needs during a period when the global community is concerned with conservation and exploitation of fisheries resources. It is assumed that the decision makers at all levels (a) recognize that information is an essential input to development plans and actions and (b) are committed and willing to support the activities designed to facilitate and promote effective and efficient delivery and utilization of information. This assumption applies to the donor community as well.

Information program is designed to meet the information needs of a group of users in a sector or institution. Thus, it is essential that the strategy of information program is closely linked with the strategies of the sector and institution. Furthermore, fisheries information programs must position themselves between the fisheries communities and their information needs, and should play a role of an active information broker, promoter and disseminator.

It is the most opportune time for the information programs in the Southeast Asian countries to respond to the needs that have been neglected for a long time, and to take a lead in facilitating effective transfer and utilization of information and knowledge for sustainable development and management of fisheries resources. The critical task is to bridge and rebuild the broken and incomplete linkages between information sources and their users.

The priority action required to address the needs of the fisheries information users, and promote utilization of research information in Southeast Asian region are

- To improve local or national information resources and services,
- To analyze, integrate and synthesize information in the context of national and local fisheries resources management issues and needs,

- To digest, package and disseminate fisheries technology,
- To compile, produce and disseminate comprehensive directories and inventories of infrastructure information such as institutions, information resources and services, on-going projects, experts, industries, etc
- To share information resources and skills through effective and efficient networking, and facilitate and promote flow and utilization of information,
- To ensure sustainability by securing adequate financial and management support of the parent institutions, and
- To develop national capacity and capability in effective organization, dissemination, and repackaging of information

Accessibility and availability are not in themselves sufficient. Rather, the most critical point is how effectively the available information is utilized. The required actions listed above are closely related to each other, and the latter four should be addressed within each of three other activities. It is, therefore, recommended to formulate regional information programs along the following three themes

- Development of national fisheries information resources and services,
- Analysis and synthesis of fisheries resource management information, and
- Fisheries technology transfer

Special attention should be given to development and (re)establishment of a strong regional leadership and coordination mechanism that facilitate and promote exchange and utilization of fisheries information. The focus of the regional information programs or networks should be to supplement and support national efforts, strengthen national capacities and capabilities, develop and promote use of common and compatible information handling methods and tools, and promote collaboration and cooperation among national and international information programs and systems

Information dissemination process encompasses a broad range of activities, in addition to collection, organization and retrieval of scientific and technical information. Libraries and information centers must move beyond the traditional functions of collecting and organizing scientific information. Information professionals must recognize the need to involve and work with other professionals involved in information generation, transmission, and transfer. Scientific and research community must recognize that they have an important role to play in making scientific and research information available and useful to the users in non-scientific and research community. Additionally, managers of the fisheries institutions at all levels and donor agencies must recognize that good information support is as fundamental and essential for research as scientific and technical training, laboratory equipment and other support is.

FISHERIES INFORMATION NEEDS IN DEVELOPING COUNTRIES **ISSUES, CONSTRAINTS AND OPPORTUNITIES**

II BACKGROUND

Over the past few decades, information programs and services supporting fisheries resources management have grown steadily. However, in spite of increasing numbers and efforts of national and international agencies, there exists a lingering doubt about relevance and effectiveness of these programs and services, particularly in support of developing countries needs. Additionally, there is a concern about sustainability of information programs and services in the developing countries.

Chapter 17 of Agenda 21 specifies the need to give priority support to data and information for management of sustainable fisheries resources (12). The role of international cooperation and coordination in supporting and supplementing national efforts to promote integrated management and sustainable development of coastal and marine resources is emphasized. Obviously, special support is needed to enhance the capabilities of developing countries in the areas of data and information management in order to enable them to participate effectively in the global initiative for sustainable development and utilization of fisheries resources.

Aforementioned concerns and needs have been well recognized by the donors who are interested in sustainable development and management of fisheries resources. A Donor Consultation was held in 1986 in order to address causes for low rate of success of fisheries development projects. Subsequently, in 1989 the Study of International Fisheries Research Needs for Developing Countries (SIFR) was commissioned by the key fisheries donors, World Bank, Commission of European Communities, NORAD, UNDP, FAO, and IDRC.

The first objective of the study was "to determine the degree to which lack of information is an impediment to effective fisheries management and development". This relates to the item 1 of the terms of reference of the SIFR, which states to provide information on "the specific constraints to fisheries development and management posed by lack of information and the ways in which these can be overcome by research". The report of SIFR (52) notes that access to information is a prerequisite for research and makes frequent reference to the needs for improved access to information. One of the action plans recommended by the SIFR is to conduct "a comprehensive review of fisheries research information needs in developing countries", and to formulate "proposals to meet the needs".

There are a number of studies reporting findings on information users, needs, constraints, systems and services in the fisheries sector (4, 5, 10, 17, 22, 23, 43, 44, 50) and in general (1, 7, 11, 16, 19, 26, 38). However, they do not examine information requirements for

development and management of the fisheries sector comprehensively. It is, therefore, necessary to conduct an in-depth study on data and information required for sustainable development and management of the fisheries resources in the developing countries, and to explore viable options for effective provision of required data and information.

II 1 Terms of Reference

Accordingly, this study was conducted with the following terms of reference

- 1 To determine data and information required at national, regional and international levels as perceived by users concerned with policy & planning, research, and extension as defined in the SIFR study,
- 2 To identify existing information programs and services to meet the information needs as determined in the objective 1 above,
- 3 To investigate the sources and nature of existing information programs and services relevant to the fisheries sector, mainly at the regional and international levels, but also at the national level when this is relevant to regional and international issues,
- 4 To assess the relevance and utility of existing information programs and services, relative to the needs identified (item 1 above), and
- 5 To prepare implementable recommendations that could be used by national governments and donors in developing proposals and projects for addressing identified needs and constraints in the short and medium term

II 2 Scope and Approaches

Considering the time available for the study, it was agreed that the study would take a regional approach in assessing the relevancy and utility of existing international and regional information sources and services. Having examined the fisheries contribution in food supply and livelihood of population in various parts of the world, it was agreed to focus this study on Southeast Asia. This approach also allows an opportunity to eventually utilize the experience gained in Southeast Asia to the other regions, in which studies should be conducted at a later date.

In identifying information needs for fisheries management and development, no attempt was made to limit the needs by the types of information. The users were asked to express their information needs regardless of the type. However, in examining information sources and services, this study limited itself to non-statistical information. Although information is normally derived from data and statistics, statistical and non-statistical information are normally managed or handled by different units in most of the fisheries organizations. In view of the importance of statistical information for the sector management, it is important to carry out a separate, in-depth study on fisheries statistics. Consequently, a separate study on fishery statistics has been recommended.

Using SIFR report (52) as a guide, this study focuses on the information needs of three groups of the users: policy-planners, researchers, and extension specialists. Policy-planners who participated in this study comprised of a group of information users whose primary job function is policy planning or advising policy-planning bodies in the government departments, and managers of fisheries research and training institutions. Researchers included a group of people who are involved in all types of research related to fisheries. They came from government research institutions, international and regional research institutions and programs, and universities. Extension specialists were from government extension agencies, both national and provincial levels, and extension and training programs of the regional institutions.

The study was carried out over a two month period from August to October 1993. Main international and regional information sources and services in fisheries were identified through various publications. Facts on information needs, and issues and constraints in obtaining needed information were gathered through the group meetings, individual discussions and surveys of information users and providers. The group meetings and individual discussions were held with the planners, researchers, extension specialists, and information specialists, including the researchers and program managers working on international and regional projects and programs, in Indonesia, Malaysia, the Philippines and Thailand. The survey forms (see pages 40-43 and pages 50-53) were distributed during the group meetings and individual discussions.

III INFORMATION NEEDS AND COMMUNICATION CHANNELS

III 1 Processes in Fisheries Resources Management

Before discussing information needs, it would be useful to review the processes involved in fisheries resources management and the information environment of fisheries sector. Figure 1 shows a highly simplified overview to illustrate major steps involved, without indicating complexity and details of interactions and interrelationships between the processes and outputs. The lines indicate the processes, and the circles indicate the outputs of the processes. Each process requires information as an input, not only from the adjacent circle, but also from other circles, and each process may collect additional data required for specific analysis, diagnosis, interpretation, etc.

The outputs of survey and data collection, i.e., fisheries data and statistics, are generally captured by fisheries statistics and socioeconomic data centers that organize and provide access to various data. The outputs of other processes are normally recorded in documents, reports, journal articles, manuals, books, pamphlets, directories, catalogues, etc. These outputs are usually captured by information and documentation centers (hereafter they are referred as information centers) and libraries that organize and

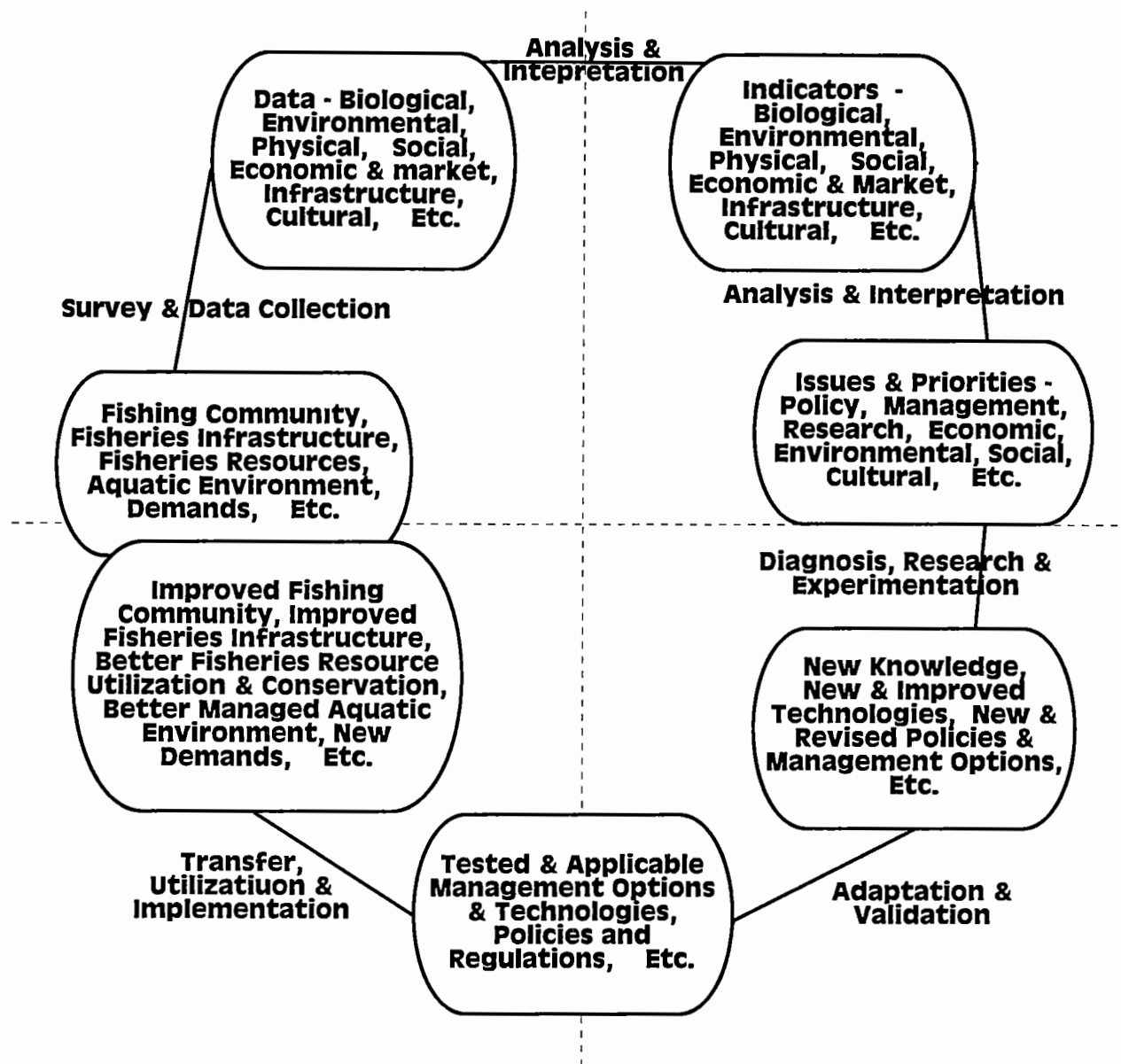


Figure 1. Processes in Fisheries Resources Management

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provide access to the sources of various information. It should be noted that fisheries data and statistics are often available in the collections of information centers and libraries as statistical bulletins, summaries, or reports.

Information environment of fisheries sector is rather complex, and has somewhat similar characteristics to other resource base sectors, e.g., agriculture, forestry and water resource management. First, in common with other resource management sectors, the fisheries resource management is location specific. At the same time, fisheries resources and water, the medium where these resources live, are mobile, covering both inland fresh-water, coastal areas and high sea. Thus, fisheries resources management requires location specific information not only in one location or country, but in a number of neighboring countries as fishes migrate and change their living environment. Sharing of data and information between the countries is essential for fisheries resource management.

Second, fisheries sector management requires highly interdisciplinary approach, encompassing life, physical, social and engineering sciences. It requires both basic, strategic, applied and adaptive research, addressing the problems and demands in the society. Therefore, fisheries information programs need to cover many aspects of scientific, social, economic, technical information at all levels.

Third, as shown above, fisheries sector management requires a tremendous amount of non-bibliographic, and non-research information. Fisheries statistics, biological, environmental, physical, social, and economic data constitute vast amount of factual data. Thus, cooperation and collaboration between various specialized information programs are essential to meet the information needs of the sector management.

Fourth, a large portion of fisheries information users is in non-research community, and have different information seeking behavior from researchers. Furthermore, the information used by the users in non-research community is often mission- or client-oriented, rather than discipline- or subject-oriented. Thus, there are special requirements for packaging and presenting information for the users in non-research community.

III 2 Types of Information Required

By examining the issues and areas of research identified in the SIFR report (52), one can easily realize that a variety of types of information is required to manage and develop the fisheries sector. A number of studies (24, 28, 30, 35, 37, 42, 50) has also reported diversified information requirement for fisheries sector management. This need for diversified types of information, e.g., from biological data, market indicators, fishermen's knowledge, to policies and regulations, is confirmed by this survey results (see page 33). Although the same types of information are required, the types of information needed by a majority of the users in each group differ, since information requirement is closely related to the job functions.

Access to fisheries information is provided in many different forms, e.g., card catalogs of libraries, indexes, abstracts, databases that can be searched on-line or available on compact discs, etc., and is facilitated through the services of information centers and libraries that perform following general functions

- To develop information resources through collection and organization of various primary and secondary information sources,
- To create access tools through analysis of the contents of the collections and identification of specific information of potentially interest and important to the users,
- To explore additional sources of information, and
- To disseminate information, and initiate and provide information services

Primary information sources such as books, journals, documents, reports, theses, reprints, conference proceedings, AV materials or information on computer discs, form the basis of information resources. Secondary information sources such as library catalogs, indexes, abstracts, bibliographies, databases, etc., provides access to the information contents of the primary information. Most of fisheries information centers and libraries have some of secondary sources in their collection, and use them as a tool for their information retrieval and services, usually resulting in a form of list of bibliographic references.

The other commonly used secondary information sources are directories and inventories, of institutions, experts, datasets, projects, equipment and facilities, industries, markets, producers, and suppliers, etc. Information centers and libraries, particularly those with the national mandates, often participate in preparation and production of these directories and inventories.

Information centers and libraries interact and cooperate with users, and have linkages with other related programs at national, regional and international levels, as well as publishers and producers of abstracts and databases.

III 3 Information Acquisition Channels

Activities and efforts of researchers, planners, policy makers, legislators, and industries generate vast amount of data and information that need to be used as an input to future and other related activities and efforts. These data and information are disseminated in a variety of ways, including reports, professional meetings and personal contacts. But, published literature, either on paper or on computer discs, is still the most commonly used medium for dissemination of fisheries data and information. In order to be effective, the literature must be available and accessible, and its contents must be known.

In obtaining needed information, fisheries information users seem to depend highly on informal information channel (see page 34). Most of the respondents appears to have relatively good personal collection of core materials in their subjects or work areas, and a network of personal contacts. A majority of the respondents utilizes informal communication channels such as personal collection, friends, or colleagues, to obtain information, and a good portion of policy-planners (70%) receives complementary copies of publications of interest to their work. It is interesting to note that a good portion of extension specialists (65 %) and policy-planners (61 %) consider media as an important information channel. It should be noted that extension specialists (20%) indicated that workshops, training courses, seminars are also an important way to be kept updated and in touch with the fellow professionals in the field.

High dependency on informal information channels has also been reported in the study of Asian fisheries science community (5). First, the scientists consider scientific and technical journals as the most important source of information, followed by library, abstract journals, personal contacts, and reprints. However, the majority (66%) of scientists have no personal subscription to international journals. The highly used journals are publications of the national fisheries societies, indicating that these scientists rely on the national publications, i.e., what is available locally. Second, half of the respondents indicated their satisfaction with the services of their libraries. Third, international or regional information sources and services are used poorly. Only 9% of respondents indicated that they have used SFIS (ICLARM), SEAFIS (SEAFDEC-HQ) or BRAIS (SEAFDEC-AQD), and only 3% indicated use of ASFA. The main reasons for not utilizing international information sources and services are unawareness of information sources and services, unavailability of nearby information services, the absence of the need to use the information sources and services, and high cost of services. These reasons are highly consistent with the responses received during this study.

At the local level, a majority of the users is served by the information centers and libraries of the institutions which the users are affiliated with, or of the research institutions, universities and government agencies that are locally accessible. The personal collections are often built through the services of the local libraries. At this level, the collections and services of the libraries are normally maintained to satisfy the information needs of the institutional staff and programs.

The libraries and information centers with the national mandates make their collections and services available not only to staff of the affiliated institutions or agencies, but also to wider users in the country. Depending on national information policies and infrastructures, various mechanisms and linkages are utilized to meet the national needs, including production of various information products such as directories of institutions and experts, union lists of collections available in the countries, methodological guidelines for information handling and management, and information management tools, including computer software, etc.

Work outputs of the participants of this study are affected greatly by lack or unavailability of appropriate information. Frequently mentioned negative effects are "work done may not be what is needed", "duplicated work, i.e., the work may already have been done elsewhere", "inappropriate advice or recommendations were made", "inaccurate assessment of critical resource problems" or "difficult to respond to the government policies and fishermen's needs". It appears that due to ineffective utilization of information, not only scarce financial and human resources are wasted, but also inappropriate management of the fisheries resources, contributing to further management difficulties or damages to the resource base.

IV INFORMATION SOURCES AND SERVICES

A brief description of fisheries information sources and services available internationally and in Southeast Asia region is given in Annex 3. Information services at international level are normally provided by international agencies such as United Nations agencies or international research centers. A number of commercial publishers produce information sources such as indexes, abstracts, special bibliographies, etc., and provide source documents delivery services worldwide.

The most relevant and widely-used international fisheries information system is ASFIS (Aquatic Sciences and Fisheries Information System), the international cooperative system coordinated by FAO (Food and Agriculture Organization), and its products ASFA. There are other information products that contain significant amount of literature of interest to the fisheries sector. They include

- AGRIS International
- Biological Abstracts
- CABI Abstract Journals
- Current Contents Agricultural, Biological and Environmental Sciences
- Fish and Fisheries Worldwide
- Food Science and Technology Abstracts
- Zoological Record

Additionally, there are number of international and regional organizations that facilitate and organize studies, workshops, and conferences, and publish and disseminate findings and outcome of their activities widely. Many of publications of these organizations are captured by and included in the above noted international information sources.

There are also number of international and regional institutions have a strong information program specifically designed to provide services to developing countries. They include FAO, ICLARM, and SEAFDEC. However, there is no clear evidence that these services are actively and fully utilized by the information users or providers in the Southeast Asia.

International information sources such as ASFA , AGRIS, BIOSIS, Current Contents are available in only a few privileged fisheries libraries in the Southeast Asian countries. Of the twelve national libraries in six countries that the consultant visited, only one has ASFA subscription, four have access to ASFA through other libraries in the same city. No national library has direct access to Fish and Fisheries Worldwide or Fishlit. Services of international or regional information centers and libraries are utilized infrequently by the users, although they are located in the same city. On the whole, fisheries information centers/libraries operate independently or in isolation. The providers are aware of other information resources and services, but they are preoccupied with day-to-day routines. Planning ahead or initiating proactive services remain on the list of tasks to be carried out as these tasks require extra ordinary efforts and resources.

Fisheries information networks exist at the national, regional and international levels, with varying degree of success. In order to promote and facilitate regional exchange of fisheries information in Southeast Asia, three regional information networks, e.g., BRAIS and SEAFIS, were established under the coordination of Southeast Asian Fisheries Development Center (SEAFDEC) in 1984 as the projects funded by IDRC, Canada. Four countries, i.e., Indonesia, Malaysia, Philippines, and Thailand, participated in the networks. It was expected that the regional activities initiated by the donor support would be continued and maintained in one form or another after the financial contribution of the donor ceased. Unfortunately, this was not the case, these regional information programs have not been active for the past several years, mainly due to the financial constraints and low priorities given to the information programs by their parent institution.

Four countries in Southeast Asia have a national fisheries information system. Three countries, i.e., Malaysia (MALFIS), Philippines (PASFIS), and Thailand (THIAFIS), have established the national fisheries information systems under the umbrella of SEAFIS (SEAFDEC). Indonesian Fisheries Information System (INFIS) was initiated as a project funded by IDRC, Canada and linked with SEAFIS. Three national systems created within the SEAFIS have been inactive since 1989 when SEAFIS became inactive. In this context, it is interesting to note that many users indicated that they have been using the services of BRAIS and SEAFIS at least occasionally or regularly. This result may have been influenced by the number of usage indicated by the SEAFDEC staff. The only active national system is INFIS in Indonesia. The success and sustainability of INFIS may be contributed to a strong leadership and commitment provided by its parent institution, Directorate General of Fisheries.

Some national bibliographies or directories of the current years exist at national level, e.g., Thai Abstracts published by Thai National Documentation Center of Thailand Institute of Scientific and Technological Research, which contains approximately twenty entries on fisheries. However, many information providers at national level frequently rely on the outdated bibliographies and directories. Examples are

- FAO 1985 A Bibliography of the Fishery Resources of the Indo-Pacific Region FAO Fisheries Circular 785 AF, Rome
- UNEP Regional Seas 1984 1972-1981 Bibliography of the Marine Environment East Asian Seas FAO, Rome
- SEAFDEC 1992 Regional Bibliography on Fisheries and Aquaculture in Southeast Asia, 1989 Compiled by Kitchaluksana, s and R Saranyapipat SEAFIS (SEAFDEC), Bangkok, Thailand
- SEAFDEC 1989 Mud Crab Abstracts Compiled by BRAIS Staff BRAIS (SEAFDEC), Iloilo, Philippines
- Chua, T E , M A A Agulto, F Y Guarin and S C Guerrero 1989 Directory of institutions and Scientists in the ASEAN Region involved in Research and/or Management Related to Coastal Areas ICLARM, Manila, Philippines

International information sources are not actively or fully utilized by the information providers in Southeast Asia. Some of the main reasons are that (a) the information sources and services are not well known to a number of information providers, (b) access to them is not convenient, (c) language and professional barriers make it difficult to effectively utilize international sources and services, and (d) materials found in the international sources are not relevant to the needs of users.

In the absence of alternative information sources, and the privileged status that comes with having an international database on compact disc, both information users and providers have said that "yes, it would be useful to have access to ASFA or a database on CD-ROM". However, the same users and providers seldom utilize the database search services available from other information centers and libraries in the same city or country. Therefore, the question needs to be asked is "if use of ASFA or database is important, why are the database and services available in the same city or country not utilized?"

V RELEVANCE AND UTILITY

V 1 Relevance and Utility

It is always difficult to measure the relevance and utility of information sources. The relevance and utility can only be assessed in relation to well defined information needs of users. Unfortunately, only a small portion of the respondents indicated their use of and satisfactions with international information sources such as ASFA, AGRIS, or BIOSIS (see pages 36). Thus, no conclusive assessment could be made. It is possible that many information users access these international information sources through their local libraries, and are unaware of the sources of the information.

It was equally difficult to assess the relevancy and usefulness of international information sources from the information providers, because (a) only few international and regional and national libraries have a convenient access to these sources, and (b) the providers'

answers are the providers' view, not the information users' view. The providers explained that international information sources are not as useful as they appear to be mainly because of the language barriers on the part of the users, and insufficient coverage of locally appropriate materials. At the same time, the providers are generally content as long as they could give something to their users, particularly a computer printout, and there was little concern about relevancy of the information provided to the users.

Nevertheless, on the basis of the feedback received during the group and individual discussions, it is possible to observe that certain segments of fisheries information users, particularly research community, have been served quite well by the international and regional fisheries information sources such as ASFA, Current Contents, and INFOFISH publications and services.

A good portion of the researchers participated in the study has indicated that information gathering is part of their research activities. They are willing to spend the time and efforts in pursuit of information. They have also indicated that publications of the related organizations such as FAO, ICLARM, INFOFISH and SEAFDEC, are the important and frequently used information sources. Many indicated that they have minimum difficulties in obtaining information through personal and informal information channels. Their main frustration is the time-lag in obtaining the original articles through interlibrary loans.

Two international information sources mentioned frequently during the discussions are ASFA and Current Contents Agriculture, Biology and Environmental Sciences (CCABES). The researchers are aware of other key information sources listed in Annex 3, and how to access them, mainly through their current or former institutional libraries. This indicates that (a) research information is relatively well organized, (b) research community has relatively good access to research information sources such as ASFA and CCABES, and (c) the format, organization and presentation of research information are suitable for researchers' use. Thus, it is possible to conclude that international abstracts, indexes, and databases covering scientific and technical literature are providing a useful service to the research community.

Then, the question is why the concern over accessibility, availability and under-utilization of existing research information and knowledge.

First, those researchers in the institutions that do not have a library or information center equipped with adequate information resources, do have difficulties with accessibility and availability of information. Unless researchers have access to some types of retrieval services from a local library, they do not know the existing information sources, or where to send a request for original articles or documents.

Second, many of fisheries information users are outside the research community, and the existing international information sources are not effective in meeting the information needs of non-research community. On the whole, research information remains within the

research community In order to manage and develop fisheries resources, the results of research must be available to and utilized by the researchers as well as the policy-planners, extension specialists and fishing community who are directly involved in management and development of fisheries resources

ASFA is an important information source in fisheries sector However, considering the sizes of fisheries literature estimated (5, 15, 32), the fisheries sector does not appear to have a comprehensive international system that collects, organizes and provides access to the literature of the sector Although ASFIS/ASFA has been filling the needs of the sector, it has been suggested that in order to cover literature of the sector adequately, ASFA needs to increase current 8,000 fisheries entries per year to 20,000 to 25,000 entries (33)

It appears that fisheries literature are scattered (18, 28, 31) by subjects or fields, e.g., biological and life science, environmental sciences, fish farming and aquaculture, food sciences for post harvest processing and handling, and engineering sciences for vessels and equipment, etc Furthermore, information sources tend to specialize according to orientation of literature, e.g., subject-oriented or mission-oriented The danger of relying on a single information source, even if it is a major international one such as BIOSIS or ASFA, and assuming that one database search extracts all the relevant references has been pointed out (40) The same study reports poor coverage of gray literature, particularly from the developing countries, in international databases Specialization by fields may not be necessarily negative, if the users and providers of information are fully aware of the uniqueness of each information source, and have access to them Unfortunately, the information users and providers in the fisheries sector suffer from lack of awareness of information sources and services (see page 37 and 47) It has been pointed out (32) that until recently most of fisheries and related literature were published in biological or life sciences publications, and use of the term "fisheries" is relatively recent development This evolution of the sector may explain somewhat slow development of a comprehensive international fisheries information system

Relevancy and utility of international information sources to the needs of the developing countries remain to be questionable Majority of international information products is developed and produced by the developed countries in North America and Europe, and the main sources of information for these products are international scientific and technical journals, books, and conference proceedings produced and published in the developed countries It has been reported that a good portion of the information generated in the developed countries may not be appropriate to the needs of the developing countries (51, 53)

Over the years, the producers of the international and regional abstracts, indexes, and databases have made efforts to increase coverage of literature from the developing countries (15, 21, 45) However, their coverage of literature of developing countries, particularly gray literature, is still rather limited For instance, a majority of the ASFIS/ASFA partners is still in the industrialized countries, i.e., only three (China, Mexico, and India) of fifteen ASFA partners, i.e., input centers, are in the developing countries According to the

evaluation of ASFA carried out in 1991 (27, 33), (a) about 25% of literature included in ASFA are in the main fisheries category, (b) only about 50% of the references listed in the various bibliographies commissioned by FAO and ICLARM is found in ASFA, and (c) relatively small portion of the main fisheries literature in ASFA is current compared with other international abstracting services Table 1 shows a crude indication of the coverage of fisheries literature of five Asian countries in two international information sources

Table I Coverage of literature of/from selective countries

	<u>ASFA</u>						<u>AGRIS</u>		
	Whole Database*			Fisheries**			Category M***		
	1990	1991	1992	1990	1991	1992	1990	1991	1992
China	615	620	565	99	138	108	---	191	98
Indonesia	63	67	50	28	26	20	293	87	88
Malaysia	47	32	51	25	17	18	61	38	61
Philippines	59	44	51	28	24	17	238	257	246
Thailand	41	105	32	21	56	17	139	181	81

Note * Number of records combined with publication year and the name of the country in all fields

** Number of records combined with publication year and the name of the country and key words [aquaculture*, aquatic*, fish*, living(3w)resource* or living(3w)marine*] in all fields

*** Number of records in the category M combined with the name of the country in all fields for each of the calendar year

It should be stressed that the above numbers are indicative figures Actual number of the records related to fisheries in both databases could be higher as the above searches are not the exhaustive ones It should also be noted that the contents of the records retrieved were not examined

FAO has been dealing with the issues related to the coverage of literature of the developing countries (14, 21, 27) and improved distribution of ASFIS products An attempt has been made to increase ASFA input centers in the developing countries, increase number of ASFA products available to developing countries and strengthen national capabilities to participate in the international information system It is anticipated that implementation of the result of the current negotiation with the producer of ASFA will begin in 1994 (27)

Here, one should be reminded of the fact that collection and organization of literature from developing countries are not the main objective of the international fisheries information sources Furthermore, it should be appreciated that there are difficulties in collecting and processing developing countries' literature Some of the difficulties encountered by the international producers would be that (a) literature from developing countries often does not meet the "scientific" or "research" standard used as selection criteria, (b) types of

information needed by the users in non-research community do not meet the scientific or research criteria, (c) language barriers and less systematic methods of publication and distribution make their effort ineffective

Results of the survey and feedback of the discussions reveal that coverage of locally appropriate information by the international information sources is inadequate. However, the causes for this inadequate coverage should not be attributed entirely to the producers of the international information sources. There is little organized effort to synthesize and digest research information, and present it in the context of local needs. That is, the research information as presented in the international information sources is not readily available to and useful for policy planners, extension specialists and field workers. In spite of their usefulness, most of existing efforts, e.g., various publications of FAO, SEAFDEC, BOBP, and national extension agencies, in these areas are too little and too ad hoc in relation to the needs.

There are several established reviews in fisheries and related fields, e.g., *Advances in Marine Biology*, *Annual Review of Ecology and Systematics*, *Marine Ecology Progress Series*, and *Oceanography and Marine Biology: an Annual Review*. The review papers which appear in international publications are normally captured by ASFA and other abstracting services. However, most of the review papers are subject- or discipline-oriented, and deal with narrow scientific topics. Fewer review papers give broad overviews of topics in fisheries resource management problems relevant to developing countries. To some extent, publications of various international and regional fisheries bodies, e.g., FAO and its various commissions, ICLARM, SEAFDEC, NACA, and BOBP, have filled in the gaps in this regard. However, there is no concerted and systematic efforts in this area.

V 2 Causes of Poor Utility

Research information captured in the international information sources is under-utilized by the users in non-scientific or non-research community. Some of the main reasons are

Contents and coverage

- Most of information needed and used by non-research community does not meet the selection criteria, i.e., scientific standard, that is used by the international information programs. Therefore, the international information sources are not as useful to non-research community as it is to the research community.
- Extension information or technology digest is seen as inferior information compared with research information. There exist few information sources and libraries actively collecting, organizing and providing access to these materials.
- Non-research information is relatively difficult to collect. Unlike research information that appears in referred journals, conference proceedings, technical reports and books, etc. that is formally published and widely distributed, non-research information is by and large produced by public or non-profit making institutions, in a form of pamphlets,

leaflets, or manuals that are distributed in a limited number without marketing or promotion

Presentation

- Research information or research outputs are packaged or presented for researchers' use, little or no attention was given to the needs of other groups of users. Research outputs are often written in scientific terminology or jargons which is not easily understandable by non-researchers (13, 41). Also, most of the research papers or reports deal with specialized and narrow aspect of a fisheries problem. Moreover, information in most of research papers is not presented in the context of local management problems and needs.
- Different information seeking behavior by the users in the non-research community requires different approaches in information delivery. Users in non-research community tend to be information-receivers rather than information-seekers. Passive information dissemination through abstracts, bibliographies, and databases is not an effective dissemination mechanism for information-receivers.

Language and professional barriers

- The trickling down process, from research to utilization, takes too long time, there is little concerted and coordinated effort to bridge the gap between research, extension, policy planning and information communities.
- Language used by the research community and international information sources, i.e., English, is not the working language of the most information users and providers.
- Distribution mechanism and infrastructure do not facilitate wider accessibility and utilization of information products. Complementary copies of the publications of international and regional fisheries organizations are often sent to the heads of the institutions or individual researchers, and remain on the book shelves of those individuals. The same applies to extension materials sent to provincial or district offices. These extension materials often get lost in the offices, and do not reach to the fishing community.

VI ISSUES AND CONSTRAINTS

VI 1 Issues

The difficulties and problems in obtaining and using information in fisheries sector are not too different from those in other sectors, e.g., agriculture (11, 19). The key issues and constraints summarized below seems to confirm the statement that in order to take full benefits of information society, one needs to speak English and live in an industrialized country (20).

Table 2 Issues and Constraints

<u>ISSUES</u>	<u>CONSTRAINTS</u>
<ul style="list-style-type: none"> • Accessibility • Availability • Timeliness of services 	<ul style="list-style-type: none"> • Poor local or institutional information resources and services • Unawareness of accessible information resources and services • Lack of qualified information staff • Lack of cooperation between information programs, particularly at national and regional level • Cost • Language, bureaucratic, and professional barriers • Poor local communication & transportation infrastructure • Poor coverage of literature of developing countries in international information sources
<ul style="list-style-type: none"> • Compatibility • Reliability • Currency of information 	<ul style="list-style-type: none"> • Lack of cooperation between information programs • Lack of systematic methods & mechanisms for collection, organization, analysis, synthesis and dissemination • Lack of qualified information staff
<ul style="list-style-type: none"> • Appropriateness • Completeness • Relevancy • Suitability • Utility 	<ul style="list-style-type: none"> • Poor local information resources and services • Lack of knowledge & understanding of users & users' needs • Lack of subject knowledge on the part of information staff • Lack of digested, integrated & appropriately packaged information • Lack of locally appropriate information • Lack of qualified information staff • Language & professional barriers
<ul style="list-style-type: none"> • Sustainability 	<ul style="list-style-type: none"> • Lack of support & commitment of senior managers, administrators, & policy makers • Lack of funds or financial resources • Lack of leadership
<ul style="list-style-type: none"> • Qualification of information staff 	<ul style="list-style-type: none"> • Lack of trained professional staff • Lack of training opportunities • Narrow view or definition of information program • Low salary and status of the positions of information staff

VI 2 Constraints

Most of the information centers and libraries in fisheries, particularly at national and subnational levels, do not have any capability to develop their information resources. As the financial resources allocated to the information programs are totally inadequate,

collection development rely on donation, gift and exchange. As a result, the providers tend to add whatever they receive to their collection regardless of relevance and utility of the materials.

The value of information is recognized by researchers and information professionals. However, this awareness is not always shared among senior managers, policy-makers, and donor agencies. They often see that support for conducting experiments, training for scientific staff, and supply of equipment are more important for research than good information service is for research. Subsequently, information program rarely receives adequate support and commitment of the managers and policy-makers (2, 25), and whenever there is funding shortage, information support is often the first to be cut, even though resources allocated is minimum and inadequate.

One of the fundamental constraints that is not widely recognized, but critical for effective access to and utilization of research information, is the narrow view of information programs by the senior managers and policy makers. Most senior managers and policy makers associate information programs with libraries and collection of books and journals. They overlook the fact that information packaging and dissemination activities such as production of extension materials and special briefs, development communications, and dissemination and extension of research information, are part and parcel of information activities. Lack of this recognition has delayed and prevented development of a wholesome information program, and qualified personnel in the field.

Qualifications and training requirements of information professionals have been misunderstood for a long time. Because of the narrow view of information activities mentioned above, it was thought that persons who like to read are suitable to become information specialists. Until recently, no or little attention was given to such qualifications as professional competence, initiative, resourcefulness, leadership, ability to work with people, etc. Consequently, the needs for professional training have not been well recognized, thus limiting training opportunities.

While librarians and information specialists exist, their training is often minimum, and their status closer to support staff than professional staff. There are few trained information resource managers, scientific editors, writers and communication specialists within the information programs. Information management and dissemination nowadays are complex business and require professional expertise (25).

Lack of appropriately packaged information products is one of the serious constraints identified by the users. Research results are available, but the users in non-research community are not able to benefit because the information is not integrated, synthesized, or digested in the context of local problems and needs. First, information users are discouraged by the amount of time and effort required to obtain the needed information. Then, incomplete, insufficient, fragmented and inappropriate information and services frustrate the users. The respondents pointed out that (a) the fundamental problem is

appropriateness of information and timeliness of services, not the lack of information, and (b) what is needed is useful information, not a publication or article

Professional barrier is one of the key constraints relates to effective access to and utilization of research information. On the whole, fisheries research information remains within the research community, and the research community makes no significant efforts to make research results accessible and useful for solving the management issues of fisheries resources and fishing community. Researchers are recognized for their "research" or "scientific" work by their peers, i.e., other researchers. They are not well rewarded for their efforts in making their research results available or known to the non-research community. Thus, the main concerns of most researchers are to produce good "scientific" publications and recognized by the research community. Few researchers consider the policy-planners, extension specialists and fishing community as their clients and the users of the research findings. Furthermore, researchers in general do not seek out feedback of the extension specialists or fishing community in identifying their research areas.

It should be understood that information users generally accept what is provided. No demand or criticism should not be seen as satisfaction by the users. It is generally known that the more services are provided, the more demanding the users become. Improved accessibility and availability of existing international abstracts, indexes or databases in developing countries will certainly remove some of the constraints and improve availability of research information. However, in view of lack of appropriate types of materials in the international information sources, improved access to those sources would not necessarily address many aspects of the issues and constraints related to locally relevant information, digested and useful technology packages, integrated and synthesized reviews, language barrier, cost of services, and qualification of information staff, etc. Therefore, attention must be given to accessibility and availability of relevant and useful information, not just accessibility and availability.

In order for the users in the developing countries to take advantage of the international fisheries information sources, following actions are required

- Relevancy of international information sources to the needs of the developing countries must be improved,
- Research findings need to be synthesized, integrated and repackaged in the context of local management problems and needs
- Language and professional barriers need to be removed,
- Core of skilled information specialists who are familiar with discipline, various relevant information sources and retrieval method, must be developed,
- Local communication and computer facilities must be improved,
- Document delivery service must be improved, so that references retrieved from the international information sources will be available when they are needed, and
- Cost of accessing international information sources must be within the means of individuals and institutions in the developing countries

Fisheries information services and systems in Southeast Asia have made a considerable progress in the past decades. However, a variety of constraints exists in utilizing international and regional information sources and services. These include low priority given to information programs, lack of facilities and infrastructure, inadequate funding or support, organizational limitations, delays caused by distance or lack of sensitivity, language and professional barriers, lack of locally appropriate information, etc. There is awareness of formal information sources and services, but there is a gap in utilization.

Additionally, there is a leadership gap in the region. Since completion of SEAFIS project in 1989, the region has been without a coordination mechanism that facilitate and promote fisheries information services and information exchange. The region does not have one active participating institution in the international fisheries information system, ASFIS/ASFA. The national capabilities developed during the SEAFIS project have been standing still over the past four years.

The fisheries information programs and systems need to improve their cooperation and collaboration in sharing information resources and human resources, and be better aware of their users' needs. On the whole, the fisheries information programs in southeast Asia are reactive and passive, rather than proactive and initiative. The sector needs to carry out a systematic analysis of information needs by user groups, information infrastructure and resources, and develop a strategy for strengthening information resources and services to meet the needs of the sector.

VII RECOMMENDED OPTIONS FOR ACTION

Following recommendations reflect the urgent needs during a period when the global community is concerned with conservation and exploitation of the fisheries resources. It is assumed that the decision makers at all levels (a) recognize that information is an essential input to development plans and actions and (b) are committed and willing to support the activities designed to facilitate and promote effective and efficient delivery and utilization of information. This assumption applies to the donor community as well.

On the basis of the above observations, the priority actions required to address the needs of the fisheries information users, and promote utilization of research information for sustainable development and management of fisheries sector in Southeast Asian region are

- To improve local or national information resources and services,
- To analyze, integrate and synthesize information in the context of national and local fisheries resources management needs and issues,
- To digest, package and disseminate fisheries technologies in locally appropriate form,

- To compile, produce and disseminate comprehensive directories and inventories of infrastructure information such as institutions, information resources and services, fisheries projects, experts, industries, etc
- To share information resources and skills through effective and efficient networking, and facilitate and promote flow and utilization of information,
- To ensure sustainability through securing adequate financial and management support of the parent institutions, and
- To develop national capacity and capability in effective organization, dissemination, and repackaging of information

The required actions listed above are closely related to each other, and the latter four should be addressed within each of three other activities. It is, therefore, recommended the regional information programs to be formulated along the following three themes

- Development of national fisheries information resources and services,
- Analysis and synthesis of fisheries resource management information, and
- Fisheries technology transfer

Special attention should be given to development and (re)establishment of a regional mechanism and leadership that will (a) facilitate regional cooperation and collaboration in information exchange, (b) supplement and support national efforts, and (c) facilitate effective collaboration and cooperation with international information systems and programs

VII 1 Development of National Fisheries Information Resources and Services

This program is to address the issues and constraints related to accessibility, availability, cost, and timeliness of services. Equipping every fisheries library or information center with adequate information and human resources may be ideal, but it is not a practical solution. However, it is practical and feasible to establish one or two well equipped libraries or information centers in each country, and use them as national resources (11, 29). Thus, the main objectives of this theme would be

- To establish few selected specialized information centers or libraries at national or subnational level,
- To develop and strengthen comprehensive information resources through acquisition of international, regional, national and local information sources,
- To compile and produce new information sources such as comprehensive directories or inventories of fisheries institutions, experts, research and development projects, information centers and resources, and funding agencies,
- To acquire facilities necessary for services,
- To establish a network of information resources and services both at regional and national, and subnational levels,
- To develop and strengthen skills of information staff,

- To initiate proactive information services, including current awareness, document delivery, referral and technical backup services to other libraries, and user orientation programs, and
- To ensure long-term viability of information program through appropriate mandates and fisheries information policies

It should be noted that the national fisheries information programs in the countries in Asia are at different stages of development, thus requiring different level of supports and approaches. As noted below, the program planning and design, and choice of technology and methodology must take the local conditions, capacity and capability into consideration.

VII 2 Analysis and synthesis of Fisheries Resource Management Information

This program is to address the issues and constraints related to appropriateness, relevancy and utility through filling in gaps in information products which are specifically integrated and synthesized in support of fisheries resource management and policy planning. Systematic provision of comprehensive reviews and briefs on national and regional fisheries management issues would assist not only in formulating appropriate management measures, but also in identifying further research and policy requirements and directions. Accordingly, the main objectives of this program would be

- To facilitate and promote exchange and utilization of information relevant to fisheries policy planning and management,
- To analyze, integrate and synthesize information in the context of regional, national and local fisheries resource management and policy planning needs,
- To establish national and regional networks of fisheries resource management information, and
- To strengthen and develop national and regional capabilities in preparation and production of reviews and briefs, including information analysis, scientific editing, writing, and effective presentation

Regional cooperation and collaboration are critical in identification of relevant issues and topics, preparation of reviews and briefs, sharing of expertise and workload, and wider dissemination of the outputs.

VII 3 Fisheries Technology Transfer

Application of conservation and environmentally sound methods of fishing and fish farming is severely limited because of limited transfer of information and knowledge to those people who are directly involved in exploitation and utilization of fisheries resources. This program aims to address the issues and constraints related to appropriateness, relevance, suitability, and presentation of information, by focusing on the

needs to transfer research results and technology to extension and fishing communities
Thus, the main objectives of this theme would be

- To systematically collect, organize and disseminate fisheries extension and technology packages,
- To facilitate and promote exchange of fisheries extension and technology packages both at national and regional levels,
- To establish networks of fisheries extension information, both national and regional levels,
- To digest and repackage information in a form of fisheries extension and technology transfer packages that are locally appropriate and in local language, and
- To strengthen and develop national capability in the areas of development communication, production of extension materials and repackaging of information

In common with other initiatives, the program design must take into consideration local needs and conditions, user characteristics, and local capacity and capability
Translation of some materials may be required both at national and regional levels
Regional cooperation and collaboration are necessary to share outputs and workload

VII 4 Mechanism for Regional Collaboration and Cooperation

In Southeast Asia, there is a vacuum in regional leadership that facilitate and promote fisheries information dissemination and utilization In the period when national information programs are in developmental stage, it is essential to have a strong regional leadership and mechanism that support and supplement the national efforts As suggested above, while an active role of the national programs in executing bulk of the program activities is necessary, regional information network(s) should be developed with the following objectives

- To develop regional information resource, services and technical capability that complement and back-up national resources, services and capabilities,
- To assess and coordinate training needs and programs at regional level,
- To facilitate and promote effective and efficient information exchange and flow at regional and international levels, including promotion of close collaboration with international information systems,
- To develop and promote use of common and compatible methodologies and tools, and
- To provide a professional forum to assess information needs, issues, and constraints, and to explore appropriate solutions to the constraints identified

The primary consideration of the regional information program or network should be to supplement and support, i e , to develop and strengthen, national efforts and capabilities, and to facilitate information exchange at all levels through adaptation of common and/or compatible information handling and management methods Regional databases should

be by-products of collaboration among the national efforts and a sub-set of a global database, rather than a primary output of the regional activity. As demonstrated by the experiences of AGRIASIA, a regional database does not have a significant role once the national capacities to participate in and interact with the international system have been developed.

Findings of this study clearly indicate that libraries and information centers must move beyond the traditional functions, and take a lead role in filling in gaps in information products and services. The approaches and activities of each program should be determined according to the capabilities, capacities and local conditions of the participating institutions and programs. Identification of the participating institutions and coordinating institutions should take into account such factors as the mandates, capabilities, existing activities, resources, commitment, and program directions of the institutions.

VII 5 Considerations for Formulating Information Programs

Information program is designed to meet the information needs of a group of users in a sector or institution. Thus, it is essential that the strategy of information program is closely linked with the strategies of the sector and institution. Furthermore, fisheries information programs must position themselves between the fisheries communities and their information needs, and should play a role of an active information broker, promoter and disseminator.

❖ Information Technology

In exploring the above options, no special mention was made about use of specific information technology, e.g., database, CD ROM, etc. Use of appropriate information sources and technologies should be determined according to the needs and local conditions. It should be recognized that one of the outputs of all three programs suggested above would include various national and regional databases.

There was a general tendency to look at CD ROM as the technological solution for accessibility and availability of information in developing countries. In light of rapid progress in information technology, and other flexible access and communication mechanisms currently available, a decision on applicable technology should be made after an in-depth study on feasibility, advantages and disadvantages of various mechanisms for accessing and delivering information, e.g., use of paper copies, on-line databases, CD ROM, and electronic mail systems such as Internet, that offer access to many databases and document delivery mechanism. In this context, it is possible for the developing regions to benefit from technological leap-frogging.

❖ **Consideration in formulating regional or sub-regional projects**

Number of studies (1, 2, 3, 6, 8, 9, 36, 38, 39, 46) report experiences in developing and designing information programs and projects as well as networking. Lessons from the past experience should be kept in mind in designing and formulating new information activities. A close attention should be paid to the experience of the regional fisheries information projects, e.g., AGRIASIA, SAFIS, BRAIS, and SEAFIS. Success of the regional initiatives is affected by many factors. Some of the basic elements to be taken into consideration are

- Program development and planning should be based on in-depth analysis of the existing situation. A clear and concise framework for the program should be spelled out, and potential partners should be identified. The plan should include clear definitions of the target users and their needs, the needs to be addressed, the objectives, scope of the activity, general methodologies, and short-term and long-term directions.
- Appropriate mandate and linkages must be established and ensured. Information program and activity should have appropriate mandates and missions, and should be based in an institution with the appropriate mandates and missions. Furthermore, the host institution should have necessary capability, commitment, and resources to support the program. Linkages with existing programs and institutions must be established for effective and efficient cooperation and collaboration.
- Scope of program and activity must be defined carefully and tightly. Information program should be needs driven. As no single information product or service can satisfy diverse needs of all users, it is necessary to focus and target. The output of the program should be focused and targeted.
- Duplicated efforts should be avoided. If there already exists a program addressing needs of the target clients, consider strengthening the existing programs whenever possible, rather than creating and starting a new program to address the same needs of the same clients.
- Multiplier effect that will increase the benefits of the investment should be ensured.
- Compatibility and complementarity must be built in. This should be applied to the program contents, methodology and procedures.
- Resources necessary to implement the program must be secured. Long-term sustainability should be taken into consideration. Non-commercial information program must be supported by its parent organization. Therefore, it is essential to base the information program in an organization that has the mandate for and commitment to such a program.
- Feedback mechanisms should be established. Interactions and interface with users must be established, and regular inputs should be received. Use of advisory groups and regular contacts, both formal and informal, are vital for relevant service and products, and continuing support of users.

❖ Networking principles

Networking, when properly implemented, offers many opportunities that are not possible for one institution in isolation or action taken independently. Networking facilitates wider impact of the activities, and increases the probability of program sustainability. It is obvious that Southeast Asia can greatly benefit by pulling its efforts together, and sharing skills and information resources. General principles for successful networking are

- Network should have clearly defined goals that are shared among the members,
- Network activities should address well-defined problems that are of interest to all members,
- Network must have a strong leadership and coordination. In this context, there is a need for a network to be based in an institution that can facilitate central coordination,
- Members must agree and be willing to share resources,
- Members must commit to share work load, and commit resources, both financial and personnel,
- Members must have at least the minimum capability to benefit from, and make a contribution to network activities,
- Members must be involved in the planning and management of the network, and
- Network must secure sustainability

VIII CONCLUSION

The findings of SIFR (52) point that "considerable improvements can be made on the basis of information presently available but that, in the long term, new and innovative research" (p. 26) and "in most cases, the information presently available is sufficient to undertake the necessary changes" (p. 27).

Information presently available seems to remain within the research community. Information is available, but the policy-planners, extension specialists and fishing community, i.e., the people who are directly involved in the management and development of fisheries resources, are not able to utilize the information for the reasons mentioned in this report. The "change" and "improvement" noted in SIFR report, would not be achieved as long as the research information remains within the research community. Research information must be made available to and utilized by the people who directly contribute to management and development of fisheries resource, and the research community must play an active role in this process.

Research has no practical value if the outputs are not used by the society, and that sustainable resource management cannot be achieved without addressing

management problems and sustainability at local level, i.e., the fishing community and local information programs. The finding of this study does not add new knowledge. Rather, the same old issues and constraints in effective flow and utilization of information are put into new perspectives, i.e., in the fisheries sector. The study consolidates and highlights the key issues and constraints, and shows the urgency for action.

In recent years, a remarkable progress has been achieved in collecting, organizing, retrieving information through the use of modern information technology. The systems have been relatively successful in organizing and providing research information for research community. However, the attempts have not been very successful in making information and technologies available to the users in non-research community, e.g., policy-makers, extension and fishing communities. There is an urgent need for the information programs to give a closer attention to the needs of the users outside the research community. Improved accessibility and availability through effective and efficient information resource and skills sharing, and filling in the gaps in appropriately digested and integrated information packages are important challenges that must be undertaken.

At this stage, it seems appropriate to observe that availability and accessibility are not in themselves sufficient. Rather, the most critical point is how effectively the available information is utilized. Various national and international institutions are involved in supporting information programs in one form or another. There is a real need to identify information gaps and neglected user groups, and to address their needs. There is an equally urgent need to develop national capacity to tackle the issues related to effective flow of information in a coordinated and systematic manner.

It is the most opportune time for the information programs in the Southeast Asian countries to respond to the needs that have been neglected for a long time, and to take a lead in facilitating effective utilization of existing information and knowledge for sustainable development and management of fisheries resources. The critical task is to bridge and rebuild the broken and incomplete linkages between information sources and their users.

Finally, it should be realized that the success of any activity depends on the commitment and the will of the people involved. Without the commitment and will to facilitate and promote sharing and utilization of research information, much of research outputs will continue to remain under-utilized.

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Annex 1 Survey of Information Users in Fisheries

BACKGROUND

In order to assess information requirements for fisheries management, and issues and constraints in obtaining the required information, a limited survey was conducted in September and October 1993. Group meetings attended by policy planners, researchers and extension specialists were arranged in Indonesia, Malaysia, the Philippines, Singapore and Thailand. A survey form (see pages 40-43) was distributed to the participants and completed during the meetings. In addition, some participants took extra copies of the questionnaires for their colleagues, and the completed forms were sent back later. A total of 96 completed forms were received by 31 October 1993. Seventeen (16) returns were not included in the following analysis because of the missing pages or the respondents used the earlier draft form circulated to several individuals for comments.

RESULTS and OBSERVATIONS

The result of the survey are presented in three columns to illustrate similarities and differences in the information requirements by the different groups of users. The total numbers of respondents in each group are thirteen (13) in the policy-planners, thirty-eight (38) in researchers, and twenty-nine (29) in extension specialists.

A Job Functions

The respondents of the survey identified the following as the main functions of their work. Although all respondents are involved in similar job functions, each group sees their primary job function differently.

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension Specialists</u>
-Planning or policy-making (13) ¹	-Research or technical work (38)	-Extension or transfer of technologies (28)
-Resource Management (8)	-Extension or transfer of technologies (19)	-Administration or management of research, technical or training programs (17)
-Research or technical work (8)	-Resource Management (14)	-Education (16)
-Administration or management of research, technical or training programs (6)	-Education (13)	-Research or technical work (14)
	-Consulting services (12)	-Planning or policy making (13)
	-Planning or policy making (12)	
	-Administration or management of research or technical programs (10)	

¹ The numbers in the parenthesis indicated the number of the respondents who marked or indicated the specific response.

B Types of Information Required

A variety of information is required for fisheries resource management. Although the same types of information are required, the types of information needed by the majority of users in each group differs according to the types of job functions.

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension Specialists</u>
-Policies & regulations (9)	-Scientific & technical literature (27)	-Extension materials (22)
-Resource management options and approaches (9)	-Biological Indicators (25)	-Scientific & technical literature (20)
-Biological data (8)	-Biological data (23)	-Fishermen's knowledge (13)
-Project information (8)	-Physico-chemical data (18)	-Project information (13)
-Biological indicators (7)	-Extension materials (16)	-Biological data (12)
-Physico-chemical data (7)	-Project information (15)	-Biological indicators (12)
-Economic & Market data (7)	-Information on producers & suppliers (15)	-Economic & market data (12)
-Economic & Market indicators (7)	-Physico-chemical indicators (13)	-Policies & regulations (12)
-Scientific & technical literature (7)	-Economic & market data (13)	-Policy planning literature (12)
-Policy & planning literature (7)	-Information on human resources (13)	-Resource management options & approaches (11)
-Sociological data (6)		-Information on vessels & gears (11)
-Sociological indicators (6)		-Information on human resources (11)
-Information on vessels & gears (5)		-Information on development assistance & funding (10)
-Information on development assistance & funding (5)		

It should be noted that some irregularity was observed. For instance, several researchers did not indicate that scientific and technical literature as a type of information needed for their work. Similarly, extension specialists did not indicate that extension materials as a type of information that they needed.

It appears that types of information needed by the policy planners and extension specialists are more diversified than the researchers. While types of information required are similar, the priorities given to each type vary according to job functions. For instance, a good majority of extension specialists (68 %) rely on extension materials and scientific and technical literature, researchers (65 %) on scientific and technical literature, and biological indicators and data, and policy-planners (69 %) on policies & regulations, resource management options and approaches.

Expectedly, the purposes of acquiring certain types of information is closely related to one's job functions The respondents indicated that information is used for the following purposes

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension Specialists</u>
-To develop indicators for management, planning & policy development	-To provide advice on management & development options	-To provide extension services
-To provide advice on management & development options	-To provide background for further research	-To provide advice on management & development options
-To identify research issues & areas	-To develop indicators for management, planning & policy development	-To develop indicators for management, planning & policy development
	-To identify research issues & areas	-To identify research issues & areas
	-To learn scientific & technical methodologies	

C Methods of Information Acquisition

The respondents use following methods in obtaining needed information

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension Specialists</u>
-Complementary copies (9)	-Friends & colleagues (29)	-Friends & colleagues (25)
-Personal collection (8)	-Personal collection (27)	-Local or institutional library (25)
-Networks & their newsletters (8)	-Networks & their newsletters (26)	-Personal collection (24)
-Other national library (8)	-Local or institutional library (23)	-Media (19)
-Media (8)	-Other national library (19)	-Networks & their newsletters (17)
-Friends and colleagues (7)	-Complementary copies (18)	-Complementary copies (15)
-Local or institutional library (7)	-Media (17)	-Other national libraries (11)
	-International or regional libraries (15)	

It appears that informal communication channels are heavily utilized by all three user groups Again, the information acquisition channels are similar, but each group gave somewhat different priority to specific channel It is interesting to observe that more extension specialists (86%) rely on local or institutional library than researchers (60 %) or policy-planners (61%) Media is used more by extension specialists (66%) and policy-planners (61%) than researcher (44%) Expectedly, at local level, the services of the institutional libraries and information centers are one of the main mechanisms through which information is obtained

D Effects of Information on Work Outputs

All indicated that information have assisted in improving the quality and quantity of their work. The respondents cited a variety of difficulties and problems caused by lack of appropriate information. The frequently mentioned difficulties may be summarized as follows

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension specialists</u>
-Planning based on proxy or out-dated data & information	-Delays in implementing & conducting research	-Hinders achievement of objectives
-Delays in formulating of management options & plans	-Produce unreliable & out-dated results	-Wasted time & efforts
-Limited scope & coverage, and creation of gaps & loopholes in policies	-Delayed recognition of cause of problems	-Delayed work or projects
-Limited effectiveness of policies	-Difficult to make conclusion of the research project	-Inappropriate advice to clients
-Difficult to maintain the original objectives of programs & projects	-Inappropriate decision on critical matters or inaccurate assessment of problems	-Inappropriate & unsuitable extension materials prepared
	-Some management concepts are overused and applied to inappropriate situations	-Unable to respond to or advise clients
	-Being out-dated in the field	-Duplication of work
	-Unable to conduct comparative analysis	-Inappropriate use or application of technology
	-Time and efforts wasted	-Technology transfer based on guesswork
	-Inappropriate recommendation made	reparation and submission
	-Duplicated work	-Inappropriate management of fisheries
	-Difficult to identify research areas & prepare research proposals	
	-Ineffective or delayed information transfer to extension	

The respondents are fully aware how their work have been negatively affected by lack or unavailability of information. Comments such as "the work may not be what is needed", "policy is being developed using outdated data and information", "difficult to respond to the government policies and fishermen's needs", "the work may already have been done in some other place", "inappropriate advises and recommendations were made", or "inappropriate management concepts were applied" seem to describe the sad reality. Implications of these comments are too awesome to contemplate, not only scarce financial and human resources are wasted, but also inappropriate management of the resource base, thus causing further damage.

E Information Sources

The main formal information sources and services used by the participants are

<u>Policy-Planers</u>	<u>Researchers</u>	<u>Extension specialists</u>
ICLARM publications (13)	ICLARM literature (30)	ICLARM publications (25)
INFOFISH (11)	FAO literature (30)	FAO Literature (23)
FAO literature (10)	INFOFISH (28)	SEAFDEC literature (21)
SEAFDEC literature (9)	SEAFDEC literature (25)	INFOFISH (21)
SEAFDEC statistics (8)	SEAFDEC statistics (19)	SEAFIS (SEAFDEC) (14)
FAO statistics (5)	SEAFIS (SEAFDEC) (18)	SEAFDEC statistics (14)
ASFA (5)	ASFA (14)	ASEAN Food Handling Bureau (11)
SEAFIS (SEAFDEC) (5)	BIOTROP (14)	FAO statistics (10)
SFIS (ICLARM) (3)	NACA services (13)	BRAIS (SEAFDEC-AQ) (8)
NACA services (3)	BOBP literature (13)	BOBP literature (8)
BOBP literature (3)	FAO STATISTICS (13)	THAIFIS (8)
AGRIS (1)	BRAIS (SEAFDEC) (12)	SFIS (ICLARM) (7)
INFOTERRA (UNEP) (1)	SFIS (ICLARM) (12)	NACA services (7)
APCAS (FAO-RAPA) (1)	INFIS (12)	MALFIS) (6)
SICEN (Philippines) (1)	Zoological Record (8)	ASFA (5)
Zoological Record (1)	SPECIESDAB (FAO) (6)	IOC literature (5)
FIPIS (FAO) (1)	ASEAN Food Handling Bureau (6)	INFIS (5)
IOC literature (1)	NOAA databases (5)	INFOTERRA (UNEP) (4)
ASEAN Food Handling Bureau (1)	IOC literature (4)	BIOTROP (4)
	THAIFIS (4)	FIPIS (FAO) (4)
	MALFIS (4)	
	AGRIS (3)	
	SICEN (3)	
	FIPIS (3)	
	NAL (U S) (3)	
	Current Contents (2)	
	AGRICOLA (2)	
	ENSIC (AIT) (2)	
	BIOSIS (1)	

A comparative analysis indicated that choice of information sources depends heavily on local availability. For instance, the users in Thailand indicate use of THAIFIS, and the users in Indonesia indicate use of INFIS.

Just over one-third of policy-planners and researchers and under twenty percent of extension specialists indicated use of ASFA, the main international fisheries information source. It appears that the users are not well aware of, and utilize international information sources and services. The above reply seems to indicate

that the users rely on the publications of fisheries institutions, i.e., readily packaged information products

ASFA was the only international information sources that the respondents rated their satisfaction. Of the five policy-planners who rated ASFA, three indicated general or over all satisfaction, and two indicated dissatisfaction with some areas. All six researchers who rated ASFA indicated their general satisfaction. None of extension specialists included ASFA in their rating of information sources and services.

The users' main dissatisfaction with the above noted information sources and services related to cost and timelines of services, currency or period of materials covered in the sources, types and geographic coverage of the materials in the sources, easy of access, and relevancy.

F Difficulties Encountered

The respondents encounter many difficulties in obtaining needed information. They can be summarized as follows:

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension specialists</u>
-Incomplete information (5)	-Poor and outdated local information resources & services (13)	-Lack of appropriate information & irrelevant local information resources (10)
-Unawareness of information resources & services (4)	-Cost of services & materials (13)	-Cost of services & materials (9)
-Lack of local data & information (3)	-Language barriers (8)	-Timeliness of services (7)
-Bureaucratic barriers & lack of coordination (3)	-Unawareness of information resources & services (8)	-Outdated & incomplete information (6)
-Incompatibility & uncoordinated data (3)	-Distance to information centers & libraries (4)	-Lack of awareness of information resources & services (5)
-Lack of program & project information (1)	-Gaps in data & information (3)	-Distance to information centers & libraries (4)
-Delay in obtaining information (1)	-Irrelevant & unreliable information provided (3)	-Language barriers (3)
	-Delay in obtaining data & information (2)	-Irrelevant information provided (3)
	-Inappropriate format & organization of data (2)	-Inappropriate format, organization & presentation (2)
		-Lack of skills & understanding of subject on the part of information staff (2)
		-No time for information (2)
		-Poor linkage between research institutions, private and government institutions (1)
Note: One indicated no difficulty, one made no comment	Note: Four mentioned no difficulties encountered, and four made no comment	Note: One indicated no difficulty encountered, and two made no comment

During the discussions, it was stressed that the main problem is accessibility and availability of **appropriate** information. It was pointed out that in order to be useful, information must be put into the context of the problem or issues in hand, and presented in a form that is useful and suitable to its users. Researchers should present their findings not only for other researchers, but also for users in non-research community. Moreover, the participants pointed out that local capacity and capability to collect and utilize information is the key to sustainable development. The consultant was reminded that unless SIFR study addresses issues related to the local needs, the purpose of the study would be defeated.

G Suggested improvements

The respondents made a variety of suggestions for improved availability of appropriate information. Their suggestions may be summarized as follows:

<u>Policy-Planners</u>	<u>Researchers</u>	<u>Extension Specialists</u>
<ul style="list-style-type: none"> -Improved availability of regional & provincial data & information (5) -Grouping of information by province or aquatic ecosystems (2) -Increased awareness of information resources & services (3) -Briefs and reviews on fisheries management issues & Integrated information packages (3) -Better cooperation & networking of information centers & libraries to improve access (2) 	<ul style="list-style-type: none"> -Improved local library collection & facility (8) -Information packages on special topics, e.g., management concepts, new products, post harvest handling & processing, fishing gears, etc (6) -Current awareness services on specific topics (5) -Reliable, current, and local specific data & information (3) -Increased relevancy & currency of information (3) -Increased awareness of information resources & services (2) -Current and less expensive publications (1) -Current information on research infrastructure, e.g., projects & funding (1) -Networking (1) 	<ul style="list-style-type: none"> -Timely, accurate & well packaged information (10) -Networking of information programs for effective and efficient access (7) -Improved support and commitment of managers, e.g., new attitude towards information program by managers of institutions (3) -Local information programs, i.e., resources & services (3) -Improved skills of information workers (2) -Open services & better consultation with users (2) -Professional forums for sharing of experience & learn from others (1)
Note Three (23 %) made no comment	Note Ten (26 %) respondents made no comments, two suggested use of high-technology without indicating areas to be applied	Note Five (17 %) respondents made no comment

Although different expressions are used, the above suggestions basically point to the following needs

- Improved local information resources and services
- Integrated, consolidated, and digested information packages that are appropriate for local use
- Increased awareness of information sources and services
- Improved sharing of information resources and services between the related programs through effective cooperation, collaboration and networking

Understandably, information users are discouraged by the amount of time and effort required to obtain the needed information, and incomplete, insufficient, fragmented and inappropriate information and services. Several respondents pointed out that **the problem is appropriateness of information and timeliness of services, not the lack of information, and what is needed is information, not a publication or article**

SURVEY OF DATA AND INFORMATION USERS

Name

Address

Dear colleague,

This information survey is being carried out to prepare background materials for a regional workshop on fishery information and statistics in Asia, to be held in February 1994. The Study of International Fisheries Research (SIFR), commissioned by FAO in consultation with the major donors to fisheries sector, stressed that the degree to which lack of information is a constraint to development and management of the sector must be studied, and the impeding factors must be removed. Your assistance in filling out this survey form is essential in designing the need-driven fisheries information programs and services. The results of this survey will be shared with you, and discussed at a regional workshop, where regional issues and priorities will be identified, and a plan of action will be formulated.

Please return the completed forms by 20 September 1993 so that the analysis and follow-up work can be completed in time for the regional workshop. Thank you for your cooperation.

Dr V Hongskul, Regional Fisheries Officer, FAO-RAPA, Bangkok
Dr M Duangsawadi, Secretary-General, SEAFDEC, Bangkok
Dr Z H Shehadeh, Executive Secretary, SIFR, Ottawa, Canada

A Please indicate up to five major activities and/or functions of your work

- | | |
|--|---|
| <input type="checkbox"/> Planning or policy making | <input type="checkbox"/> Resource management |
| <input type="checkbox"/> Education | <input type="checkbox"/> Research or technical work |
| <input type="checkbox"/> Extension or transfer of technologies | <input type="checkbox"/> Consulting service |
| <input type="checkbox"/> Technology - post harvest processing | <input type="checkbox"/> Development assistance and funding |
| <input type="checkbox"/> Marketing | <input type="checkbox"/> Consensus building for resource management |
| <input type="checkbox"/> Facilitator in public or community participation in decision making | |
| <input type="checkbox"/> Administration or management of research or technical program(s) | |
| <input type="checkbox"/> Technology - Aquaculture engineering, gear and vessel technology | |
| <input type="checkbox"/> Development communication | |
| <input type="checkbox"/> Other (Please specify) _____ | |

B Please give examples of specific benefits or positive outcomes from use of information
(eg. stopped spread of disease of mussels, thus preventing major disaster in the community,
helped to develop new product, etc.)

C Please indicate types of information required for your work (check appropriate box), and indicate purposes by numbers listed below (e g , C2, C5, C11)

Types of Information

Purposes
(see below)

- ☐ Biological data, eg catch and effort, plankton surveys, research observations
- ☐ Biological indicators, eg stock assessments, productivity, growth rate
- ☐ Physico-chemical data, eg coastal resource surveys, water chemistry, oceanographic data, temperature, salinity
- ☐ Physico-chemical indicators, eg pollution index
- ☐ Economic and marketing data, eg consumption, demand, wages
- ☐ Economic and market indicators
- ☐ Sociological data, eg surveys of livelihood, migration
- ☐ Sociological indicators, eg population, employment
- ☐ Policies and regulations
- ☐ Resource management options and approaches
- ☐ Scientific and technical literature
- ☐ Extension material such as validated technologies
- ☐ Policy and planning literature
- ☐ Fishermen's knowledge on stocks, migration, trends in size of fish, etc
- Infrastructure information on
 - ☐ vessels and gears
 - ☐ producers and suppliers
 - ☐ human resources, including experts
 - ☐ institutions and facilities, eg center of excellency
 - ☐ projects (research, development, extension), eg who is doing what
 - ☐ development assistance and funding, eg who is funding what
- ☐ Other types of information Please specify
- ☐ Other types of information Please specify

Purpose.

- C1 To develop indicators for management, planning and policy development
- C2 To provide advice on management and development options
- C3 To provide background for further research
- C4 To identify research issues and areas
- C5 To learn about scientific and technical methodologies
- C6 To provide advice on infrastructure development, e g facilities, education, etc
- C7 To provide extension services, e g , materials and advice
- C8 To identify problems and issues in fishing community
- C9 To improve enterprises
- C10 To develop new technology, e g , new products, gear, farming systems, vaccine
- C11 Other (please specify)
- C12 Other (please specify)

D Please indicate the main ways through which you acquire information that you require (Check all that apply)

- ☐ Personal (i.e., your own) collection, subscriptions, and personal database searching
- ☐ Friends and colleagues
- ☐ Networks and their newsletters
- ☐ Complementary copies
- ☐ Local, i.e., your institutional, library or information services
- ☐ Other national library or information services
- ☐ International or regional library or information services
- ☐ National data centers
- ☐ International or regional data centers
- ☐ On-line database searching - by yourself
- ☐ On-line database searching - by staff of library or information center
- ☐ Media, e.g., TV, newspaper, radio
- ☐ Other means (please specify)

E Please describe to what degree your work has been negatively affected by lack of information?

F Which of the following information sources or services have you used? Please indicate in terms of frequency of use by entering one of the following numbers
0 (never), 1 (once only), 2 (a few times), 3 (occasionally), 4 (frequently)

- | | |
|---------------------------------|--|
| F1 AGRIS | F2 BIOSIS |
| F3 ASFA | F4 ZOOLOGICAL RECORD |
| F5 FFA DATABASE | F6 AGRICOLA |
| F7 ICLARM PUBLICATIONS | F8 FAO LITERATURE |
| F9 SFIS (ICLARM) | F10 FIPIS (FAO) |
| F11 IOC DATABASES | F12 SPECIESDAB (FAO) |
| F13 INFOTERRA (UNEP) | F14 FIDI (FAO statistics) |
| F15 NOAA DATABASES | F16 IOC LITERATURE |
| F17 BRAIS (SEAFDEC) | F18 NATIONAL AGRICULTURE LIBRARY (USA) |
| F19 APCAS (FAO Regional Office) | F20 PIMRIS (PACIFIC) |
| F21 BIOTROP | F22 SEAFDEC LITERATURE |
| F23 NACA SERVICES | F24 SEAFDEC STATISTICS |
| F25 SEAFIS (SEAFDEC) | F26 INFOFISH |
| F27 BOBP LITERATURE | F28 ASEAN FOOD HANDLING BUREAU |
| F29 ENSIC (AIT) | F30 THAIFIS (THAILAND) |
| F31 SICEN (PHILIPPINES) | F32 MALFIS (MALAYSIA) |
| F33 NARA INFORMATION SERVICE | F34 INFIS (INDONESIA) |
| F35 OTHER (Specify) | F36 OTHER (Specify) |

G Take the five most used sources and services from the question above F (e g F2, F35), and rate your satisfaction, on a scale of 1 (poor) to 5 (excellent), in terms of

	<u>Rating</u>
Information Programs and Services (eg F2, F35)	
Subject coverage	
Geographic coverage	
Languages coverage	
Period covered	
Types of material covered, eg grey, refereed, govern reports	
Currency of data and information	
Format and organization	
Cost of service	
Timeliness of service	
Ease of access	
Relevancy of materials and services received	
Reliability of information	
Effectiveness of information staff	

H Please describe difficulties and problems that you encounter in using and obtaining data and information required for your work, including gaps, relevancy and timeliness of services, difficulties in accessing (e g , due to cost, distance, equipment and language barrier), format and organization of data and information provided, not being aware of information sources or services, availability, coverage, qualification of information staff, etc

I What kind of information or services would assist you in doing your work?

**Thank you for your assistance Please use the envelope provided and mail before
20 September 1993.**

Annex 2. Survey of Information Providers in Fisheries

BACKGROUND

In parallel with the survey of information users, a survey was conducted to assess the perception of the fisheries information providers in Southeast Asia. During the group meetings and visits to individual institutions, the survey forms (see pages 50-53) were distributed to the persons in-charge of the libraries or information centers, requesting to complete one form per library or information center. Total of forty one (41) completed forms were returned, and thirty seven (37) were included in this analysis. Of the thirty seven, two (2) libraries are from international organizations, four (4) are from regional organizations, and the rest are from the national or subnational institutions.

RESULTS and OBSERVATIONS

A Users and Services Provided

The fisheries libraries and information centers provide services to a wide range of users. The providers indicated that the main users of their resources and services are

- Researchers and technical workers (35)¹
- Students (24)
- Policy makers and planners (23)
- Extension and Field workers (21)
- Administrators, managers of research programs (20)
- Buyers, sellers, importers (16)
- Fishermen and fish farmers (15)
- Educators (15)
- Fisheries resource managers (14)

Although scales of the operations differ, the services of libraries and information centers consist of following

- Access to publications of their institutions
- Document delivery services or photocopying services
- Question-and answer services, and some times in written replies
- Prepare and provide reference lists upon request
- Loan services from their collection

¹ Number indicates the number of the providers that have indicated specific response

- Database search services
- Prepare special briefs
- Referral services

It should be noted that two information centers indicated that they participate **directly** in training courses organized and conducted by their institutions, and prepare and produce extension materials or information packages for fish farmers. Most of libraries and information center contribute to such activities **indirectly** by providing information to those who prepares and organize training courses and information packages

All libraries and information centers indicated that their services are free to the institutional staff, most of local and national users, and staff of the institutions and government agencies that their parent institution collaborate with. Some fees are charged to recover the cost, mainly to the international users in Europe and North America

B Information Resources and Types of Information Provided

The main types information supplied by the providers are

- Scientific and technical literature (31)
- Biological data (19)
- Physico-chemical data (18)
- Biological indicators (17)
- Extension materials (17)
- Infrastructure information such as on-going projects, experts, institutions, facilities, and industries (15)
- Policies and regulations (13)

Considering the fact that researchers, technical workers and students are the main users, it is not surprising to see the above list is very similar to the types of information required by the research group (see page 33)

Collection of the libraries and information centers consist of mainly national and international books and journals, proceedings of international meetings, data collected by their institutions, publications of their institutions, extension materials, reprints collections on special topics of importance to their parent institutions, publications of international organizations. Most libraries and information center do not deal with trade literature, only one reply indicated trade literature is part of the library collection. The collection are acquired through purchase, exchange, gift or donation, complementary, including reprints from authors, or sample copies, or free copies received from international and regional institutions

Collections in the many libraries and information centers consist of outdated materials, with minimum or less than minimum reference tools such as key indexes, abstracts, directories, etc. It should be pointed out that many libraries of national institutions have minimum or totally inadequate acquisitions budget, and many international materials are acquired wither by donation, gift, or exchange. Thus, they do not have any control over collection development. In many cases, there exists no collection development policy or guidelines, there is tendency to add to collection whatever is received or given.

Most fisheries libraries and information centers do not participate in formal collaboration with other information centers in the country. Although national fisheries information system exist in Malaysia, Philippines and Thailand, the systems have been inactive since the regional coordinating mechanisms (SEAFIS and BRAIS) became inactive in 1989. Five of thirty seven providers indicated that they send their input to AGRIS. The only national fisheries information system still active is INFIS in Indonesia. INFIS continues to send their inputs to SEAFIS, without realizing that other SEAFIS participating countries do not send their inputs and SEAFIS exists only on paper.

D Frequently Used Reference Materials

The providers indicated following as frequently used information sources

- ASFA (13)²
- FAO statistics (11)
- National fisheries statistics (7)
- FAO Publications (7)
- SEAFDEC literature (7)
- ICLARM literature (6)
- AGRIS and AGRISIA (6)
- FSTA (3)
- INFOFISH (3)

Five providers indicated that they use in-house databases (i.e., machine readable library catalogs), and six indicated use of publications of national agencies, special bibliographies, and directories. However, it should be noted that number of bibliographies and directories mentioned are outdated by several years, most of them were published in 1980's.

It become apparent that most of the fisheries information providers in Southeast Asia do not actively, and fully utilize international information sources and services. The main

² It should be noted that some irregularity have been observed. Some of the providers who were not aware of and did not know how to access ASFA during the visit by the consultant, have indicated access to, use of ASFA.

reasons are (a) unawareness of information sources, (b) language and professional barriers, and (c) inconvenient access. The providers explained that international information sources are not as useful as they appear to be mainly because of the language barriers on the part of information users, inappropriate format and presentation, and the insufficient coverage of locally appropriate materials. As a result, the providers find that the special bibliographies (although they are outdated), publications of key fisheries institutions, and material in the national or local languages more useful.

E Difficulties and Constraints

In meeting the information needs of their users, the providers are faced with following difficulties

- Information requested are not available, i.e., poor local collection (23)
- Language barriers, i.e., most of the source documents are in English (14)
- Cost of accessing non-local information sources (8)
- Information is not specific to satisfy the users' needs (7)
- Unawareness of available information sources and services (this applies to both information staff and their users) (7)
- Unorganized or unanalyzed collection (5)
- Useless and out dated local collection (5)
- Format and presentation not appropriate for the users (4)
- Required information is too technical for information staff (3)

Some providers indicated that physical remoteness prevents the users using information. It should be noted that most of the providers in Thailand indicated that they do not have any major difficulties. They also stressed that their users need materials in Thai, not in English or other language. This may be because of better information resources and infrastructure in the countries, and specialized clients they serve within their institutions.

In several cases, the providers expressed their satisfaction as long as they can give something to their users, particularly in a form of computer print out, it did not appear that they are concerned with the users' satisfaction or quality of information provided.

During the discussion, the providers expressed their inability to respond to the needs of the users in non-research community, i.e., extension and field workers, and planners and policy makers. They pointed out lack of information sources for these group of users, as the existing information resources are often either too general, too technical or specialized, incomplete, and not enough technology information in local languages. They stressed the needs for information packages for extension purpose, and special reviews and brief for fisheries managers, policy makers and planners. Here, one should observe that the difficulties encountered by the providers are very similar to the difficulties and needs expressed by the users (see pages 37-38).

Many providers had difficulty in estimating size of their users. However, they felt that they are reaching only small portion of their users. Following two examples illustrate the way the providers and users see the situation. During the group discussions that were attended by both information users and providers, a question was asked why the users do not come to the libraries. The users, with considerable difficulties, indicated that

- 1 They already know what is in their library, the collection and services have not changed for many years, they have been the same for the last five, ten years. They (i.e., the users) indicated that they are wasting their time by going to their library, and
- 2 They do not know where to go and what is available where. In some cases, the providers did not know what other providers in related areas have

In the first case, the library resource and services are totally inadequate to serve the users' needs. The staff do not know what to do about the hopeless situation. In the second case, there is lack of coordination and cooperation between the related agencies and programs, and lack of promotion of information resources and services.

The providers are keenly aware of the shortcomings of their information resources and services. However, the resources (e.g., staff and operating budget) allocated for their operations is totally inadequate to meet the demands. Several libraries that the consultant visited had hardly any current materials, and what is available is acquired through exchange, gift or donation. Many of their staff have no or less than minimum training in library or information management. Whatever skill they acquired are by their own experimentation.

F Suggested Measures for Improvement

The providers indicated that following measures will assist them in meeting their users' information needs

- Technical manuals and information packages for fishing community in local language (13)
- Adequate in-house information staff, and skills development for information staff (12)
- Improved local collection (11)
- Networking, cooperation and collaboration between related information programs and improved referral and document delivery services (11)
- Improved collection of national and local data and information (5)
- Special briefs and reviews on specific issues in fisheries (5)
- Promotion of information sources and services, and initiation of proactive services (4)

- Comprehensive current directory of fisheries organizations, information sources and services, research institutions, experts, projects, producers, etc (4)

It should be noted that the suggestions made by the providers appears to be very consistent with the suggestions of the information users (38). During the group discussions attended by the users and providers, the providers pointed out that the users have an important role to play in facilitating effective information dissemination. First, most of the information users are also the information generators. The work outputs of the researchers should also be presented in such a way that they can be used not only by the other researchers, but also users in non-research community.

There was a growing recognition that information dissemination involves not only librarians, database managers and information managers, but also other professionals such as development communication specialists, scientific writers, and researchers. The information providers are asking other professionals to assist them by packaging, synthesizing, and consolidating information in an appropriate form so that information would become relevant and useful to local users.

SURVEY OF DATA AND INFORMATION PROVIDERS

Name

Address

Dear colleague,

This information survey is being carried out to prepare background materials for the regional workshop on fishery information and statistics in Asia, to be held in February 1994. The Study of International Fisheries Research (SIFR), commissioned by FAO in consultation with the major donors to fisheries sector, stressed that the degree to which lack of information is a constraint to development and management of the sector must be studied, and the impeding factors must be removed. Your assistance in filling out this survey form is essential in designing the need-driven fisheries information programs and services. The results of this survey will be shared with you, and discussed at a regional workshop, where regional issues and priorities will be identified, and a plan of action will be formulated.

Please return the completed forms by 20 September 1993 so that the analysis and follow-up work can be completed in time for the regional workshop. Thank you for your cooperation.

Dr V Hongskul, Regional Fisheries Officer, FAO-RAPA, Bangkok

Dr M Duangsawadi, Secretary-General, SEAFDEC, Bangkok

Dr Z H Shehadeh, Executive Secretary, SIFR, Ottawa, Canada

A Please indicate the number of staff in your information service or program

Professional staff

Support staff

B Please indicate the forms of information, ie types of services, that you provide

☐ Consultation or written advice

☐ Reference lists

☐ Publications of your institution

☐ Special briefs

☐ Data from numerical databases

☐ Loans from your collection

☐ Copies of articles or documents requested or retrieved in searches

☐ Others (please specify)

C Please list names of key fisheries information sources that you use frequently, eg ASFA, BIOSIS, FAO statistics, local database, etc

Direct access, ie available in your institution

Remote access

D Please indicate your policy on fees for the services provided

- ☐ Free ☐ Fee to recover costs ☐ fee to make some profit
☐ fee depending on country of the requester ☐ Exchange
☐ Fee depending on complexity of service ☐ Other (please specify)

E Please indicate the size of your collection/ databases in the areas of fisheries, and the main sources of your information resource in terms of percentage**Size of collection/database(s) in fisheries**

volumes/items

- Sources**
- ☐ Books and journals, international (%)
 - ☐ Books and journals, national and local (%)
 - ☐ National and local government documents (%)
 - ☐ Reprint collection on special topics (%)
 - ☐ National and local grey literature (%)
 - ☐ Extens materials (%)
 - ☐ Trade literature (%)
 - ☐ Publications of interantional and regional organizations (%)
 - ☐ Publications of your own institution (%)
 - ☐ Data collected by your own institution (%)
 - ☐ Data acquired from national and local agencies (%)
 - ☐ Data acquired from international organizations (%)
 - ☐ Other (please specify) (%)

F Please indicate the type of information you provide (Check appropriate box)

- ☐ F1 Biological data such as catch & effort, plankton surveys, research observations
- ☐ F2 Biological indicators such as stock assessments, productivity, growth rate, maturity
- ☐ F3 Physico-chemical data such as coastal resource surveys, water chemistry, oceanographic data, temperature, salinity
- ☐ F4 Physico-chemical indicators such as pollution index
- ☐ F5 Economic and marketing data such as consumption, demand, wages
- ☐ F6 Economic and market indicators and trends
- ☐ F7 Sociological data such as surveys of livelihood, migration
- ☐ F8 Sociological indicators such as population, employment
- ☐ F9 Policies and regulations
- ☐ F10 Resource management options and approaches
- ☐ F11 Scientific and technical literature
- ☐ F12 Extension materials such as validated technologies
- ☐ F13 Policy and planning literature
- ☐ F14 Fishermen's knowledge, eg stocks, migration, trends in size of fish, growth, etc
- ☐ F15 Infrastructure information on vessels and gears, producers and suppliers, human resources & experts, institutions and facilities, on-going projects (research, development, extension), development assistance and funding
- ☐ F16 Other (Please specify)
- ☐ F17 Other (Please specify)

I For each of your main target user groups (choose by number(s) from the list above G), please estimate the size and proportion of the group that you are reaching and indicate what difficulties you have in meeting your users' needs (e g , cost, relevancy, language barriers, accessibility, availability, format, gaps in coverage)

Target user group	Size & Proportion using your inf (%)	Difficulties in meeting user needs
(eg 5	90 20%	Users are not aware of the services provided, users can not read English articles
6	50 50%	Required information is not available or organized

J What are the kind of information and services, do you think, will assist you in meeting your user needs?

Thank you for your assistance Please use the envelope provided and mail before 20 September 1993.

Annex 3 SELECTED INTERNATIONAL AND REGIONAL INFORMATION RESOURCES AND SERVICES IN FISHERIES

In common with other disciplines and sectors, the fisheries sector needs an international information system that collects, organizes, and disseminates literature of the sector comprehensively and globally. ASFA, under the leadership of FAO and other international agencies, has become the major bibliographic information source in the field of fisheries. However, in today's complex world, it is difficult for one bibliographic information source to be effective in meeting variety of information needs of the sector. There are other information sources which cover special and important aspects of the fisheries sector management. In the following, brief descriptions are provided about main international fisheries information products such as abstracts, indexes and databases related to fisheries, and the international and regional organizations, professional societies and research networks that maintain a strong information program and an active publication activity, focusing on Southeast Asia.

Information Sources and Services

ASFA (Aquatic Sciences and Fisheries Abstracts) is an abstracting and indexing service covering the world's literature on the science, technology and management of marine, brackish and freshwater environment. It is an output of ASFIS (Aquatic Sciences and Fisheries Information System), an international information system maintained jointly by four UN agencies, FAO, UNEP, UNOALOS, and IOC, and national partners in 11 countries, under the coordination of FAO, and published by the Cambridge Science Abstracts (CSA).

Approximately 400,000 records are included in ASFA since 1971, with annual addition of about 35,000 new entries. Input to ASFA is provided by a network of ASFA participating organizations in Canada, China, France, Germany, Japan, Mexico, Norway, Portugal, UK, former USSR, FAO, UN-OALOS, and CSA. Literature related to fisheries are covered mainly in ASFA-1, Biological Sciences and Living Resources. It is available in three media, (a) printed journals in three parts (ASFA-1, Biological Sciences and Living Resources, ASFA-2, Ocean Technology, Policy and Non-Living Resources, and ASFA-3, Aquaculture Abstracts), (b) ASFA database, and (c) ASFA database on compact disk (CD-ROM). Two "spin-off" abstracts are ASFA Aquaculture Abstracts and ASFA Marine Biotechnology Abstracts.

Fish & Fisheries Worldwide produced by National Information Services Corporation (NISC) in Baltimore, U S, contains over 200,000 worldwide bibliographic citations on fish and fish-related topics. Fish & Fisheries Worldwide combines several databases, i.e., computer file equivalent of Fisheries Review (U S Fish & Wildlife Service), FISHLIT database of JLB Smith Institution of Ichthyology at Rhodes University in South

Africa, AQACULTURE file of NOAA (National Oceanic & Atmospheric Administration), and FISH HEALTH NEWS abstracts from U S National Fisheries Research Center at Leetown, WV It is available on CD/ROM

AGRIS (International Information System for the Agricultural Sciences and Technology) coordinated and produced by FAO, is an abstracting and indexing services covering world's agricultural sciences and technology literature The AGRIS database contains more than 2,000,000 entries, with average annual addition of about 119,000 new entries Input to AGRIS is provided by 149 national AGRIS centers and 24 regional and international centers As a result of many developing countries' participation in the system, literature published in developing countries is particularly well represented in AGRIS database Although the main emphasis of AGRIS is land based agriculture, it covers literature in fisheries under Category M, and for number of developing countries, AGRIS has more on fisheries in general than ASFA has AGRIS is available in printed form (AGRINDEX), AGRIS database, and AGRIS on Compact disk

CABI (Commonwealth Agricultural Bureau International) Abstract Journals - Although the various aspects of land based agriculture are the main emphasis of the CABI abstract journals, literature on many aspects of aquaculture and fish farming such as fish genetics, nutrition and diseases, economics, marketing and trading of fish and fish products, aquasilviculture systems, are captured by the CABI abstract journals It has been estimated that over 2,000 records in the fields of Aquaculture and fish farming are added to CABI databases annually

ZOOLOGICAL RECORD - Produced by BIOSIS, this is an unique information sources in zoological research, including marine species, covering such subjects as behavior, ecology, feeding and nutrition, parasitology, reproduction, and zoogeography Its 6,500 sources includes journals, books, newsletters, conference proceedings, etc It is available in printed form, database (from 1978-) and CD ROM

FISHLIT - Produced by the J B L Smith Institute of Ichthyology in collaboration with the South African Water Information Centre in Pretoria, it covers fish-related literature and is useful to ichthyologists, aquaculturalists, fisheries scientists, fishermen, and students It puts emphasis on tropical areas, developing countries and Africa in particular FISHLIT is available on CD ROM as a part of Fish and Fisheries Worldwide

BIOSIS Previews (Biological Abstracts) - One of the key information sources in biological sciences, including biochemistry, food sciences, some biomedical and agricultural research Literature in fisheries and related fields are covered under various subjects such as ecology (environmental biology), oceanography, oceanography and limnology, wildlife management, and food technology

Food Science and Technology Abstracts - Produced by International Food Information Service, this abstract contains over 420,000 citations of literature in food science and

technology Sources include more than 1,800 journals, as well as patents, standards, books, conference proceedings, research reports, dissertations, and legislation It is available on printed form, online database and CD ROM

FISHFAX developed by U S National Seafood Inspection Laboratory, contains information on biological profiles, processing methods, nutritional values, economic considerations and public health information by a species specific basis

ACQUIRE (Aquatic Information Retrieval) - Produced by Computer Science Corporation, it is an international database for finding aquatic toxicity information

Current Contents - Produced by Institute for Scientific Information, it provides bibliographic coverage to articles listed in the tables of contents of 6,900 leading journals in all sciences The journals are grouped by broad subject areas, e g , Current Contents Agriculture, Biology and Environmental sciences, and it is available in printed form, online database, and on diskette

SciSearch - Produced by Institute for Scientific Information, it provides bibliographic data plus citations to worldwide journal literature in scientific and technological discipline It covers approximately 4,500 journals It is available in printed form, online database and CD ROM

Water Resources Abstracts - Produced by U S Geological Survey, it covers international literature in such subjects as aquatic sciences, hydrology, marine geology, oceanography, and pollution It is available in printed form (Selected Water Resources Abstracts), database and CD ROM

FIPIS (Fishery Project Information System) produced by FAO-Fisheries Policy and Planning Division is a database of on-going fisheries projects funded by international donor agencies The inputs are provided by 26 multilateral and 20 bilateral donors to FAO with the information about their fisheries projects The main purpose of this file is to coordinate donors' activity and use it as FAO's internal planning tool, but the database is available free of charge on request on diskettes

FIPDAT (Fishery Policy and Planning Databank) produced by FAO - Fishery Policy and Planning Division, is a combined database of various aspects of fisheries statistics and socioeconomic data in time series Data come from mainly the databases of the UN systems (note the original sources of most of UN statistics are the statistical offices of the countries), and are supplemented by the national statistical reports, field studies and other documents Presently, it is used mainly internally within FAO, but is available to anyone upon request free of charge, on diskettes

GLOBEFISH produced by FAO, provides information on global fisheries market, including price, factors influencing supply and demand, and other trade related information. GLOBEFISH database covers news items, and statistics collected from approximately 150 trade journals and forty experts in various parts of the world, and is available on-line. GLOBEFISH publications include GLOBEFISH Highlights and GLOBEFISH European Fish Price Report. GLOBEFISH also provides information packages based on the GLOBEFISH Technical Information Center (TIC), and on printouts of the GLOBEFISH database.

AGRIASIA - Produced by AIBA (Agricultural Information Bank for Asia), Los Banos, Philippines, is a database of agricultural sciences literature, including over 6,000 records on fisheries of five ASEAN countries. AIBA also maintains a directory file, CARIS-SEA, of on-going research in the Southeast Asian region. While most of the entries in AGRIASIA and CARIS-SEA are found in the AGRIS and CARIS databases, AGRIASIA contains some unique records. In recent years, most countries in Southeast Asia have been providing their inputs directly to the international AGRIS centre and receives the global database, i.e., AGRINDEX and AGRIS on CD ROM.

PIMRIS (Pacific Island Marine Resources Information System - Managed by University of South Pacific Library, Agency, PMRIS is a regional database covering literature related to fisheries of Pacific islands.

Organizations and Programs with Strong Information Program or Component

In addition to many international information products noted above, there are many international and regional organizations that are actively involved in publishing literature on fisheries that are important to Southeast Asian countries. Publications of these institutions are frequently captured by the international indexing and abstracting services, and database producers noted above.

FAO (Food and Agriculture Organization of the United Nations) - FAO through its Fisheries Department, promotes national and international action programme for the rational management and development of world fisheries. It assists member countries in formulating policies, objectives, and programmes, and when appropriate to establish infrastructures necessary for sustainable management of living aquatic resources.

One of the important activities of FAO is the provision of information and statistics on various aspects of fisheries. It publishes many technical documents, circulars and manuals, including current awareness publications such as Marine Science Contents Tables (MSCT) and Freshwater and Aquaculture Contents Tables (FACT). FAO maintains wealth of information and data in many of its databases such as ASFA, FIDI, GLOBEFISH, FIPIS, FIPDAT, AGRIS, and CARIS. FAO also organizes and conducts training programmes in data and information management in all FAO program areas,

including fisheries, as well as develops standards and guidelines in collaboration with participating institutions

It should be noted that FAO is in the final stage of making vast information resources collected and maintained by some 40 databases in FAO through WAICENT (World Agricultural Information Centre). Aspects of fisheries information available through WAICENT include production, products, utilization, marketing, commodity balance, and trade

Indo-Pacific Fishery Commission (IPFC) - One of the Commissions established under the FAO constitution, IPFC has a mandate to promote the full and proper utilization of living aquatic resources. The objectives of the commission include to assemble or otherwise disseminate information regarding the living aquatic resources and fisheries. Through many of its subsidiary bodies, IPFC produces various publications, including technical reports and proceedings of meetings on various aspects of fisheries resource management

Indian Ocean Fishery Commission (IOFC) - One of the Commissions established under the FAO constitution. In common with IPFC, IOFC is mandated to promote proper utilization of fisheries resources of the member countries through identification of management issues of relevance to the regions. IOFC's current program centers around fishery management problems. The Bay of Bengal Committee oversees the implementation of small-scale fisheries in the Bay of Bengal and adjacent areas through BOBP. IOFC also produces various publications, such as technical reports and reports of various meetings

IOC/UNESCO (Intergovernmental Oceanographic Commission of UNESCO) - Marine Information Management (MIM) is one of the priority programmes of IOC. Through its various activities and projects, IOC generates number of marine information products such as MEDI (Marine Environmental Data Information Referral System), IOC manuals and Guides, Directories of Scientists, and IODE (International Oceanographic data and Information Exchange) Handbook, and organizes training programmes in marine data and information management

ICLARM (International Center for Living Aquatic Resources Management) - One of the Consultative Group on International Agricultural Research (CGIAR), with the mission to contribute to sustainable improvements in productivity of fisheries. ICLARM maintains a strong information program consisting of library and publishing unit. The information service answers enquiries from around the world and maintains bibliographic databases, with emphasis on ICLARM program areas. A variety of technical publications and a regular newsletter, NAGA, are published. In collaboration with number of national and international organizations, ICLARM is undertaking the FISHBASE project, creating a database on 5,000 species of fish, including nomenclature, distribution, ecology, morphometrics, population dynamics, reproduction, diseases and parasites, genetics and aquaculture systems, as well as bibliographic references. The FAO's SPECIESDAB

provides scientific and vernacular nomenclature as well as ecological and fisheries information on marine and brackish water species

ICLARM Library provides **SFIS** (Selective Fisheries Information Services), an in-depth information service in the areas of ICLARM program areas, e g , finfish and mollusc culture, integrated animal or crop-fish farming, resource management, small-scale or traditional fisheries, coastal zone management. A list of bibliographic citations on the subject of inquiry is accompanied by selective key documents

South Pacific Forum Fisheries Agency (FFA) - The agency is concerned with the policies related to fisheries management, and regional cooperation in surveillance and enforcement of EEZ, post harvest processing and marketing. One of the main functions of FFA is to collect, prepare and disseminate information on fisheries

SEAFDEC (Southeast Asian Fisheries Development Center) - An intergovernmental technical organization established in 1967, with the objective of promoting fisheries development in Southeast Asia through mutual cooperation among the member countries. The SEAFDEC's many functions include (a) to collect and analyze information related to the fisheries in Southeast Asia and (b) to provide the members with the results of studies and researches by the Center and other information. SEAFDEC publishes technical reports and statistical bulletins

SEAFDEC hosts three regional information systems, **SAFIS** (Southeast Asian Fisheries Information Services), **SEAFIS** (Southeast Asian Fisheries Information System) and **BRAIS** (Brackishwater Aquaculture Information System). **BRAIS** (Brackishwater Aquaculture Information System) is a specialized information analysis center in SEAFDEC-Aquaculture Department, that collects and disseminates Brackishwater aquaculture information through a network of participating centers in Malaysia, Indonesia, Philippines and Thailand. **SAFIS** was a project that aimed to facilitate effective transfer of fisheries technologies through regional cooperation in collecting, producing and disseminating extension materials. **SEAFIS** was established in SEAFDEC headquarters in Bangkok, Thailand to strengthen regional collaboration and promote effective exchange of fisheries information within Southeast Asia. The **SEAFIS** project funded by IDRC, Ottawa, established a network of national information systems (see below), established common methods of information handling in the region, provided equipment and training opportunities for national staff. However, since the project terminated in 1989, both **SEAFIS** and **BRAIS** have given the priorities to the needs of their parent institution, i e , SEAFDEC, and have maintained little or minimum level of regional activities

INFOFISH is an Intergovernmental Organization serving the fisheries industry of the Asia-Pacific (headquarters in Kuala Lumpur, Malaysia). **INFOFISH** services are available to subscribers in member countries. However, individual subscriptions to its publications and access to services are available to industries in non-member countries at non-member fee rates. **INFOFISH** publishes two regular publications, i e , **INFOFISH**

Trade News and INFOFISH International, and other publications such as special reviews, market reports, investments profiles, directories, etc. INFOFISH maintains close links with FAO world-wide fish marketing information network comprising INFOFESCA (Latin America), INFOPECHE (Africa), and INFOSAMAK (Arab countries), and has direct access to the GLOBEFISH (FAO) databank and FAO library in Rome

NACA (Network of Aquaculture Centers in Asia-Pacific) - An intergovernmental organization established in 1990, to assist its member countries to expand Aquaculture development efforts. One of the program activities of NACA is to collect and disseminate data and information relevant to its members. NACA's publications include a regular newsletter, reviews, technical reports and studies, training manuals, and guidelines on various aspects of aquaculture.

AADCP (ASEAN Aquaculture Development and Coordinating Programmes) - A project funded by European Community (EC), beginning in 1990 for a five year period. Main objectives of the project are (a) to improve the socio-economic conditions of the rural poor of ASEAN through aquaculture developments, (b) to improve the productivity and economic viability of ASEAN aquaculture, (c) to optimize available marine, coastal and inland resources for aquaculture, (d) to encourage long-term ASEAN regional collaboration in aquaculture research and development, training and extension, and (e) to foster long-term collaboration between EC and ASEAN.

AFF (ASEAN Fisheries Federation) - An organization established in 1989 with the objectives of (a) serving as an ASEAN body from the private sector to implement and deal with the problems of ASEAN cooperation in the fisheries industries, (b) assisting the member governments in implementing programmes to conserve and manage the fisheries resources, (c) to facilitate the exchange of information and formulate programmes and policies and other aspects relating to the fish and fish based products and marketing, (d) to develop joint strategies for increasing exploitation and consumption of fish and fisheries products in traditional and new market, (e) to seek the relaxation and removal of tariff barriers and other obstacles to trade, (f) to establish standardization of the quality and grading rules of fish and fish based products, and (g) to keep under constant review development relating to supply, demand and prices of fish and fish based products.

ASEAN/Canada Post Harvest Technology Project (phase II) - A project funded by Canada beginning in 1992 for a five year period. The objectives of the project are (a) to strengthen and up-grade inspection, quality control, processing and production development systems in ASEAN countries, and (b) to assist in development and implementation of improved methods and technologies of fish processing, preservation and packing to enhance market opportunities. The project activity includes production and dissemination of a series of extension materials in post harvest handling and production.

ASEAN Food Handling Bureau (AFHB) - Functions of AFHB include establishment of a pool of information on appropriate food handling and distribution systems, through the

collaboration of information and results of projects implemented AFHB's technical information service, APEX, was set up in 1986 to provide current information according to specific subjects as required by the clients In addition to various in-house databases, APEX utilizes relevant international databases, and the service is open to non-ASEAN countries Fisheries is not one of the current program priorities of AFHB Recently, AFHB has signed to be the regional distributor for International Food Information Service (IFIS), the producer of Food Science and Technology Abstracts

BOBP (Bay of Bengal Programme), began as a project funded by SIDA, "Development of small-scale Fisheries in the Bay of Bengal" in 1979 The follow-up project "Small-scale Fishfolk Communities" was funded by SIDA and DANIDA The participating countries, Bangladesh, India, Malaysia, Sri Lanka and Thailand, provided contributions toward information services sub-project Additionally, BOBP executed a number of projects funded by ODA, UNDP, AGFUND, IMO and SIDA With the long-term objectives of improving the standard of living and the quality of life of small-scale fisherfolk, the BOBP addressed major issues of development and management of fisheries in the sub-region, through assistance to member countries in establishment of national priorities and promotion and coordination of national and regional fisheries programmes BOBP maintained a strong information activity

SEAPOL (Southeast Asian Programme in Ocean Law, Policy and Management)

SICEN (Seaweed Information Center) of the Marine Science Institute of the University of the Philippines, Diliman, is a specialized information analysis center for information on seaweed It collects and disseminates literature on seaweed, and baseline data for stock assessment, as well as produces state-of-art reviews on various aspects of seaweed culture and production

Professional Societies and Research Networks

- IAMSLIC (International Association for Marine Science Libraries and Information Centres)
- Asian Fisheries Society
- Asian Fisheries Social Science Research Network (ICLARM)
- Aquaculture Genetics Network of Asia
- Southeast Asian Marine Science Association
- Mollusc Network
- Network of Tropical Aquaculture Scientists (ICLARM)
- Network of Tropical Fisheries Scientists (ICLARM)
- National fisheries and fisheries related societies

National Information Programs

Most countries in Asia have national or special libraries and information centers in fisheries and/or aquaculture. Four countries, Indonesia, Malaysia, the Philippines and Thailand, in the region have national fisheries information system. Level of development and activities vary from country to country. Three national systems developed under the SEAFIS project are basically in an inactive mode since the regional coordination and leadership ceased to exist in 1989.

INFIS (Indonesian Fisheries Information system), coordinated by Directorate General of Fisheries (DGF), Ministry of Agriculture, collects, process and disseminates fisheries science and technology information in support of national fisheries development. INFIS provides training opportunities for the provincial and district information staff, and provides technical backup. It gives a special attention to information needs for extension, and produces national fisheries bibliography, extension manuals and leaflets, code of practice and INFIS Newsletter.

MALFIS (Malaysian Fisheries Information System) was set up by the Department of Fisheries Malaysia under the SEAFIS project. MALFIS is a network of national information related agencies, coordinating collection and processing of both bibliographic and non-bibliographic information. Presently, non-bibliographic information component of MALFIS is functioning, the bibliographic component is not.

In the Philippines, the framework of **PASFIS** (Philippine Aquatic Sciences and Fisheries Information System) with focal point at the University of Visayas in Iloilo City, Philippines, was developed by under the SEAFIS project. However, it did not get off the ground. At the moment, **NFIS** (National Fisheries Information System) project under the leadership of BFAR (Bureau of Fisheries and Aquatic Resources) is at an early stage of implementation, replacing PASFIS.

THAIFIS (Thai Fisheries Information System) was established by the National Inland Fisheries Institute of Department of Fisheries, in 1985 under the SEAFIS project. THAIFIS maintains a national fisheries bibliography and produces acquisition lists of materials from the contributing libraries. THAIFIS has not been able to provide effective national information service since the support from SEAFIS was ceased in 1989.

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- 18 In addition, information packages of CABI, GLOBEFISH, INFOFISH, Asian Food Handling Bureau, BIOSIS, Zoological Records, Science Citation Index, Current Contents, Food Science and Technology Abstracts, and Fish and fisheries Worldwide are used

TERMS OF REFERENCE

- 1 To represent SIFR on the working group of the Regional Information Workshop to be held in February 1994,
- 2 To assess, through questionnaires and national meetings in selected countries, data and information required at national, regional and international levels as perceived by users concerned with policy & planning, research, and extension as defined in the SIFR study,
- 3 To identify existing information programs and services to meet the data and information needs as determined in the objective 1 above,
- 4 To assess the relevance and utility of existing information programs and services, relative to the needs identified (item 1 above), examining the sources and nature of existing information programs and services relevant to the fisheries sector, mainly at the regional and international levels, but also at the national level when this is relevant to regional and international issues,
- 5 To prepare a report of the findings of the task 2, 3 and 4, and recommendations which could be used by national governments and donors to guide development assistance in this area,
- 6 To coordinate and monitor work of two consultants who are responsible for the comparative studies of international and regional fisheries data and information programs and services,
- 7 To collaborate with the regional initiative organized by SEAFDEC and FAO-RAPA, and on the basis of the findings of the task 4 above, provide background materials to the Regional Information Workshop to be held in February 1994,
- 8 To participate at the Regional Information Workshop as a resource person, and
- 9 To collaborate and assist in formulating re-proposal concept papers and in seeking donor supports

The first draft report will be submitted by 31 October 1994 reporting the findings of the tasks 2, 3 and 4 above